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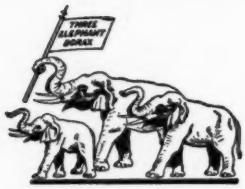

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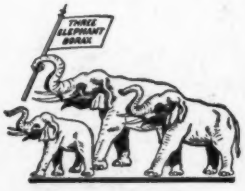

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Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: 1155 16th Street, N. W., Washington, D. C.

VOLUME XXVI NUMBER 9

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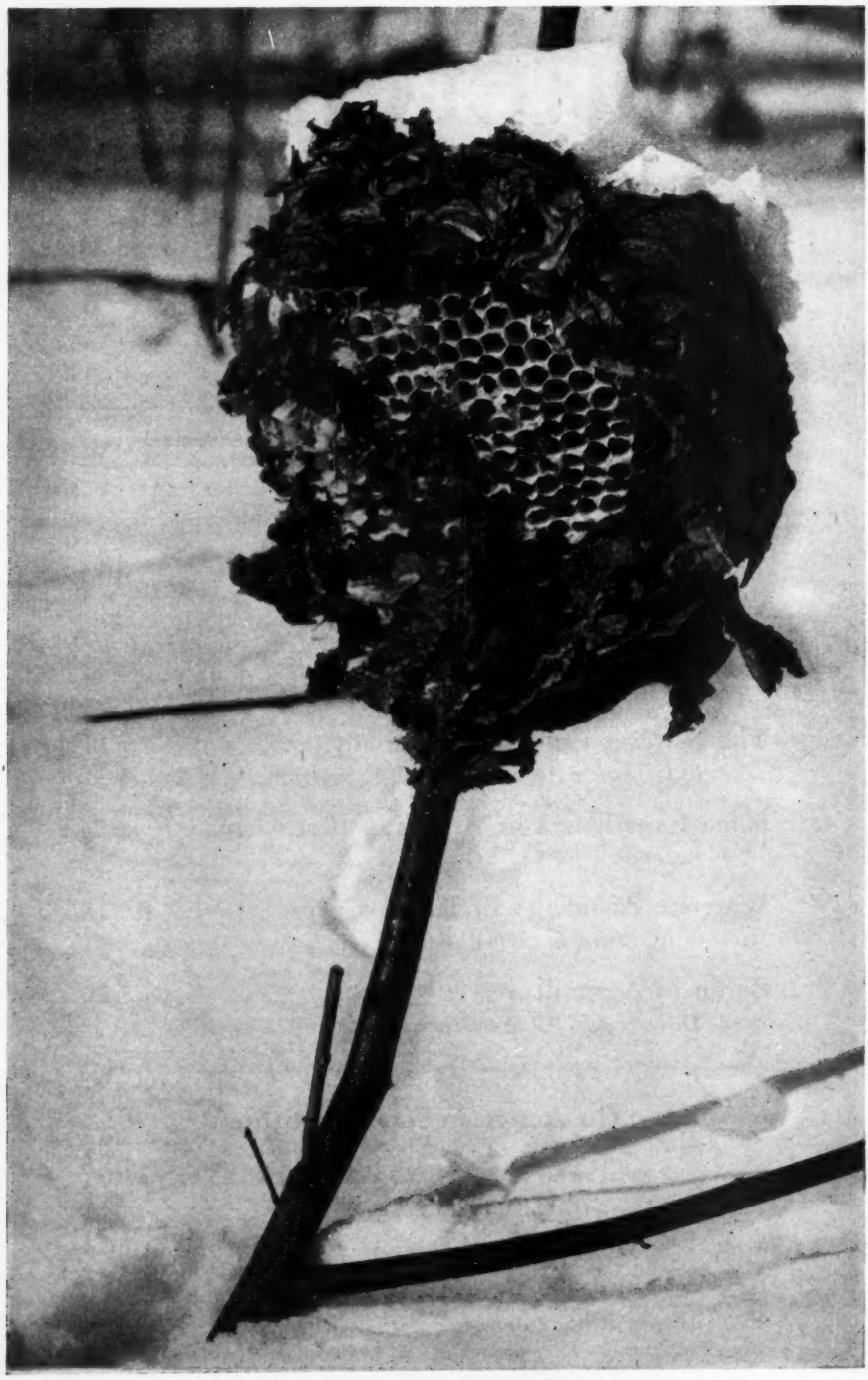

NO TENANTS NOW—DUE TO FUEL RATIONING?

Better Crops with PLANT FOOD

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VOL. XXVI WASHINGTON, D. C., NOVEMBER, 1942 No. 9

Consider and give . . .

Thanks For A Little

Jeff McDermid

IT'S NICE to look back and count over the small things, which were really big things, that we used to be thankful for as winter set in around our hearthstones. Especially now, when we are so apt to be disdainful of what was then the keynote of comfort and the acme of perfection. In other words, what would amount to a stiff rationing of modern necessities to us in these high standard days would in our youth have been like those wondrous pages of Jules Verne—something to be marveled at and put aside as figments of the over-wrought imagination.

If I thought similar reading matter in reverse might do some good to the up-and-coming generation which is so surfeited with magic in ordinary life, then I would hand them my well-thumbed copies of Hoosier Schoolmaster and Mark Twain's Gilded Age.

However, I fear such gestures would unhappily be futile. The strata of our population that is doing the world's heavy work and bumptious bombing is not in any mood to scrape the bottom of old barrels or grope in dim crannies by candlelight. Their desire is to go forward with a firm stranglehold on the blessings of invention and discovery so as to open even broader and more glamorous vistas for their children and the great days ahead for liberty and democracy—or something equally stirring.

Yet this persistence of theirs for progress and the green light on full speedways need not deter me from doing a bit of homely philosophizing here in my own humble inglenook. For one thing, it is bound to put me in a better humor to part with my usual

amount of coffee and sugar, and to do without as much electric light, fuel oil, and gasoline as I know I am entitled to as a leading member of the armchair combat squad.

Yet I am more particularly anxious that my neighbor Jones get a lift out of this. He is not by any degree the moral philosopher that I am. Although he is a few years older, he has seemingly forgotten the mud he waded through right in front of his family ramshackle; the shameful old nag he had to curry off and hitch up with frayed harness twice a day; the length he allowed his matted locks to dangle as a boy; the dirty lamp chimneys around his house, and the huge oak logs he had to buck up in the woodshed—or get something else in that same locality.

Despite those devilish backgrounds, he sets himself up as a constant and irritating critic of all current administrations, township, county, state, and nation. He scribbles long *bono publicos* in a bone-headed way to the "local distorter." They appear mixed up with the want-ads and the obituaries and make me snort worse than hay fever.

BY CONTRAST, I am quite resigned to rationing, because it is little enough for us to undergo when so many of the younger generation are paying the utmost price for any liberty we ever dished up to them.

For if worst comes to worser, I can run the reel backwards and relax once more amid those bucolic indoor winter diversions that were our chief solace and delight in days (and nights) of yore. A man like Jones lacks the courage and imagination to do likewise—although I often suspect his folks indulged in nothing more amusing than making faces at each other.

Families in my time were shut-ins compared with the gadabouts we see so little of in modern home circles. Ninety per cent of our time was either spent in the household environs or visiting with the neighbors close by us. Except for lodge nights and prayer meetings, everybody stayed around the hearth after the supper dishes were done.

I REMEMBER the first nickelodeon or movie house that opened in our town, using an old pool hall for its initial run. Even though the admission was only five cents, the program was so short that few wanted to invest that much, besides the energy it took to hike downtown again. The illustrated songs that one had to stand for at the end of each jumping, flickering, and spotty film produced such a low state of mind bordering on morbid frenzy as to thin out the customers.

Prior to that, the nearest we had come to public enjoyment of shadow pictures was when the husky twin evangelists hit their stride in our town, bringing along a full set of colored slides portraying the consequences of sin. These big twin preachers were the life of our hamlet for two months, and they were so masterful that their sermons and songs attracted the worst converts that the town boasted. They wore black sideburns and heavy gold watch chains, clerical bow ties and double-breasted swallow-tail coats. I won't give their denomination because even at this late and worldly period it might make some loyal devotee mad to know how easily those sky-pilots led the oldest members of rival pulpits into their seances.

Anyhow their weekly climax came with the baptism of previous grists of mourners. They had a big bathtub affair rigged up back of the rostrum and led the cringing victims down into it in their best underwear, to the tune of "Happy Day, Happy Day". We kids used to snuggle up on the carpet of the front aisle so as to watch the performance.

All went well enough until they tackled Burly Brown, the town drunkard, weighing nigh onto a fifth of a ton. When they doused him into the pool he hollered that it was an insult to surround him with so much water,

and he spat and struggled so lively that the second twin had to drop his hymn book and dive in to save his brother from suffocation. Burly had the first twin down, you see. There was water everywhere in the church and the wall paper was splashed so bad they had to do the job over. Folks going by said they thought the dam had burst, and

those inside who heard Burly's remarks must have thought so, too.

That protracted spell of religious fervor was the neatest bit of wholesome entertainment we ever had in our town while I was a kid. No circus ever touched it for variety, and with a circus you had to pay admission or stay outside.

Because the Office of Defense Transportation promises us the greatest stay-at-home winter we have had in these parts since my youth, a review of what we innocents did with our homework in the long gone years may be of passing value.

I doubt if much of my category of diversions will be adopted owing to the existence of the telephone and the radio. This is a resonant and talkative age, and sound waves travel so much farther and are caught up so much more potently than they were when lung power and a favorable atmosphere were the mainstays of long distance communication.

Casual or light and the deep or purposeful reading were, of course, our chief amusement. Nowadays, I hesitate to risk my reputation as a keen observer by saying whether the lovers of fun and fiction exceed the ones who revel in theses and formulas. That is like saying that the frivolous outnumber the profound in our generation today. Just as I make up my mind about the matter I run against a snag.

For instance, my daughters know every movie star and radio band by heart, and they keep alive to the popular songs and modern dances. When they find I am at sea in that regard, they are apt to switch the talk to a statistical or mathematical problem, or discuss some abstruse text in physics or chemistry, and expect me to brighten up and take some part in the hefty discussion. Still finding me silent and reticent for very obvious reasons, they try again to make me feel comfortable and ask me if I care to argue the merits of certain tennis players or golf champions. I usually get out of the mess by excusing myself to finish another erudite essay on the state of the nation and what ails the world. (All good columnists need an educated family to do the reading while they are writing.)

Getting back to the old home circle, I confess none of us were systematic students in our leisure hours—at least only so far as brief preparation for school condemned a few juveniles to literary prisons, temporarily. Unlike my parents, who could recite long stanzas from McGuffey's Readers and speak pieces from Webster's Speller, I cannot recite even the names of the classroom texts I was doomed to study and forget. On the contrary my memory clings to the daring and delightful, the imaginative and inspirational, the romancers and the humorists, the travelers and adventurers. Their pages were perused with fervor and laid aside with deep reluctance as nine o'clock arrived and the last chunk was put into the stove and the clock was wound by a yawning father.

And pray, what manner of authors and characters were they who intrigued me, even as the gaudy hero-comics seem to fasten themselves upon the youngsters in this age of marvels? The

(*Turn to page* 43)

Fig. 1.—Fertilization stimulates common lespedeza growth on a Leon fine sand, Gainesville, Florida. Left to right: no fertilizer; lime and potash; lime and superphosphate; superphosphate and potash; and 1,500 pounds lime with 450 pounds 0-16-8, all inoculated. Right: properly fertilized, but not inoculated.

Lespedeza Pastures For Florida

By R. E. Blaser

Florida Agricultural Experiment Station, Gainesville, Florida

THE utilization of legumes in pastures increases the quality and quantity of feed and serves as a cheap source of nitrogen. Coastal Plain soils are especially low in nitrogen, thus stressing the need of a legume-grass pasture.

Annual lespedezas are generally considered to be adapted especially to the heavier textured soils. Tests were started in 1938 to study the possibilities of growing them on sandy soils. Experiments were designed to study soil series, fertilization, inoculation, seeding date, and varieties as related to growth. These experiments disclose that certain varieties of lespedeza do grow satisfactorily in Florida, provided that suitable soils are chosen and the proper fertilization and seeding techniques pursued.

Annual lespedeza has volunteered in pastures and along roadsides on the heavy textured soils or soils underlaid with clay in western Florida for many years. It is thus thought that lespedeza is adapted especially to clay soils. Only sparse and occasional stands of lespedeza occur naturally on sandy soils of Peninsular Florida.

Lespedeza variety and fertilizer tests show that the low, imperfectly drained, sandy soils of the flat pinelands (Leon, Plummer, Bladen, Bayboro, Portsmouth, and St. Johns) are suitable from the standpoint of moisture for growing lespedeza. These sandy soils with five or more inches of a dark surface layer (high in organic matter) are especially desirable for growing lespedeza. The higher organic matter soils are preferable because they have a higher moisture-holding capacity, thus furnishing moisture during the critical dry period in May and June. Organic matter also enhances the base exchange capacity of soils which reduces leaching of minerals.

Tests show that annual lespedezas

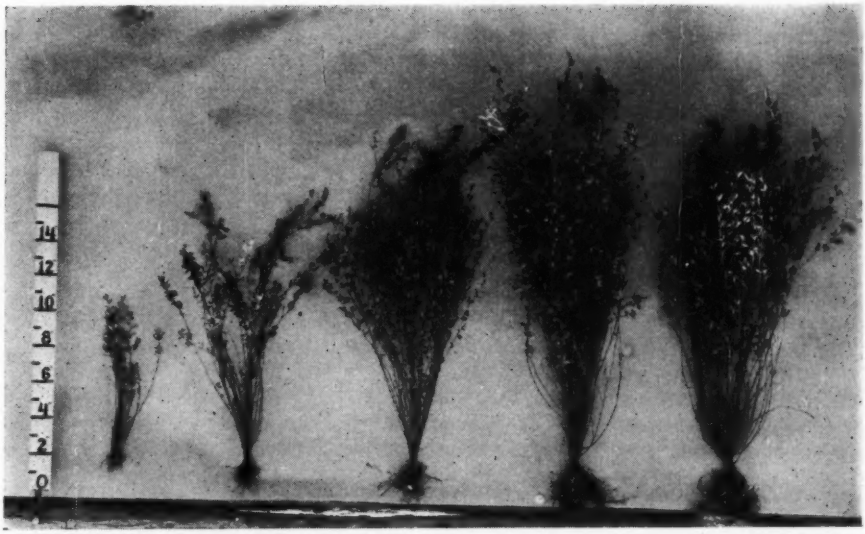

Fig. 2.—Kobe lespedeza growth with fertilizer mixtures on a Plummer fine sand, Orlando, Florida. Left to right: lime and superphosphate; lime and potash; superphosphate and potash; 1,500 pounds of ground limestone and 450 pounds 0-16-8; and 1 ton dolomitic limestone and 450 pounds 0-16-8.

generally fail on the well-drained sandy soils because of drought and injury due to nematodes.

Fertilizer tests were made with lespedeza on Leon fine sand at Largo, Gainesville, and Dinsmore; on Plummer fine sand at Orlando; and Bayboro fine sand at Gainesville. These tests were designed to study rates, mixtures, sources of fertilizers and also varieties, planting date, and inoculation on growth of lespedeza.

Typical lespedeza growth on two tests on sandy soils with several lime and fertilizer mixtures are shown in Figs. 1 and 2. Inferior stands and growth occurred on both soils without fertilization. The best growth of lespedeza was obtained when treated with 1,500 pounds of lime and 450 pounds of 0-16-8 fertilizer per acre.

When superphosphate was omitted from the lime and fertilizer mixture on the Leon fine sand near Gainesville, the lespedeza plants were dwarfed and had purplish green leaves with purplish veins. These phosphorus-deficiency symptoms are described in detail in Fig. 3. Without fertilization the lespedeza plants were also deficient in phosphorus, but the leaves were yellowish with purplish veins. The lack of phosphate fertilizer on stand and growth of lespedeza on the Plummer fine sandy soil near Orlando is shown in Fig. 4.

Potassium proved to be important on all soils studied. When a lime and superphosphate mixture was used without potash, the lespedeza plants were dwarfed and had mottled yellowish leaves with burned leaf edges (potassium-deficiency symptoms) as described in Fig. 5. The potassium-deficiency symptoms have occurred on all sandy soils studied.

Dolomitic limestone was used in place of ground high calcic limestone with the superphosphate-potash mixture on three soils. Either source of lime was found satisfactory, but the growth was somewhat superior when ground high calcic limestone was used.

Rock and colloidal phosphates applied at 3,000 pounds per acre with 36 pounds K_2O produced good lespedeza growth (Fig. 6). Tests show that rock or colloidal phosphates applied at the rate of 1,500 pounds per acre with one-half ton of lime and 36 pounds K_2O also produces good lespedeza growth.

Lespedeza also made satisfactory growth when treated with one-half to one ton of basic slag and 36 pounds K_2O or with 500 pounds basic slag, 1,500 pounds of lime, and 36 pounds K_2O.

The best fertilizer treatment for perpetuating lespedeza is not yet known. Lespedeza treated with 1,500 pounds lime and 450 pounds of 0-16-8 fertilizer the initial year produced good growth in the two subsequent years when treated with 18 pounds K_2O or 225 pounds of 0-16-8 fertilizer. Potash should be applied every year on sandy soils. Recent results also show that the

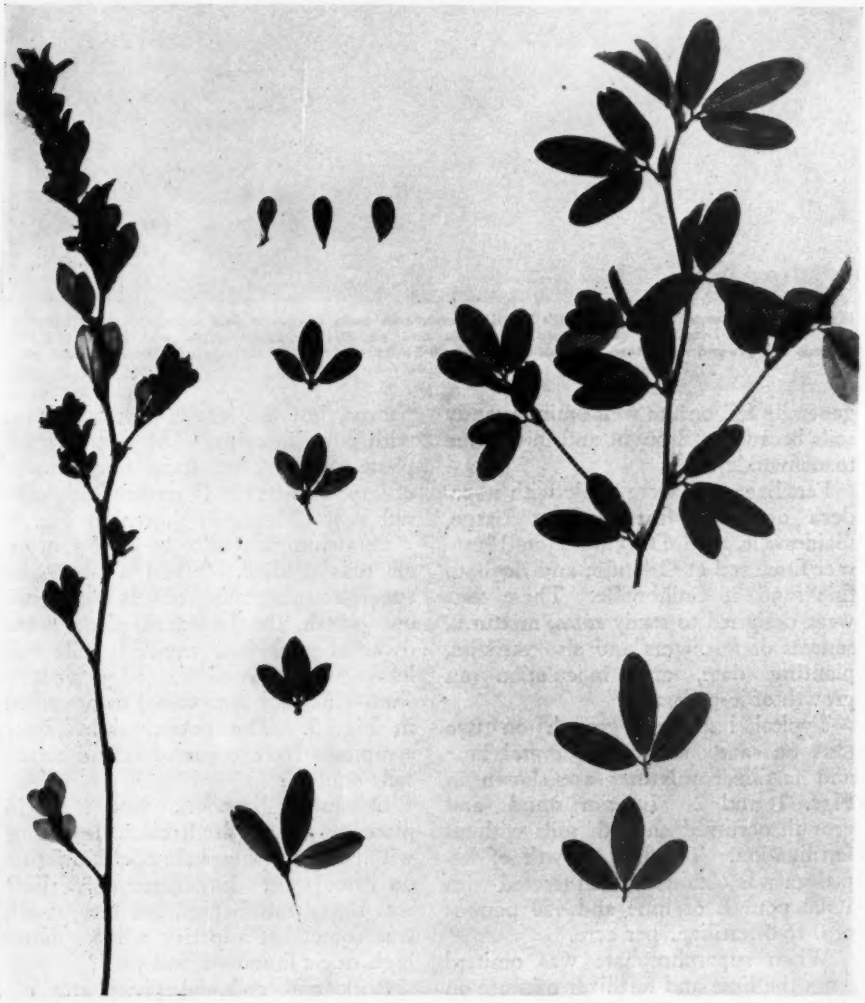

Fig. 3.—Phosphorus-deficient plants and leaves as found when fertilized with a mixture of 1,500 pounds ground limestone and 36 pounds K_2O per acre are shown on the left and center of photograph, respectively. Normal growth resulted when 72 pounds of P_2O_5 per acre were supplied (right). Phosphorus-deficient lespedeza plants which occurred in the presence of potassium and calcium fertilizers on a Leon soil are dwarfed in size with short branching stems. The branching stems and leaves are clumped closely to the main stem in an erect position, as shown on left of photograph. Center shows phosphorus-deficient leaves which are dwarfed in size and vary from a very dull, dark green to a distinct purple and purplish green color. Low center shows a phosphorus-deficient leaf which is purplish in color and possesses dark purple mid-veins and petioles. Lower right shows normal leaves, which are light-green in color with white mid-veins. Without fertilization phosphorus deficiency occurred, but the leaves were yellow with purple veins and margins.

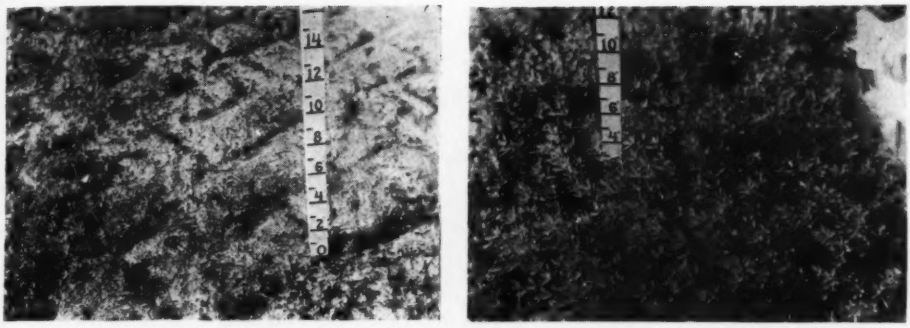

Fig. 4.—Balanced fertilization improves stand and growth of common lespedeza on a Plummer fine sand. Left: poor stand when treated with 1 ton of lime and 36 pounds K_2O. Right: treated with 1 ton lime and 450 pounds 0-16-8.

potash fertilizer in initial and subsequent applications of fertilizers might well be increased.

The use of fertilizers involves two primary objectives, namely, increased productivity and improved quality of forage. The latter is often more important than the former.

Although lespedeza is a legume and considered to be an excellent feed, its mineral and protein content were augmented greatly by fertilization. The chemical analysis of lespedeza grown with certain fertilizer mixtures on Leon and Plummer fine sands are given in Tables 1 and 2. Application of lime, superphosphate, and muriate of potash resulted in significant increases in calcium, phosphorus, and potassium content of lespedeza on both soil types. On

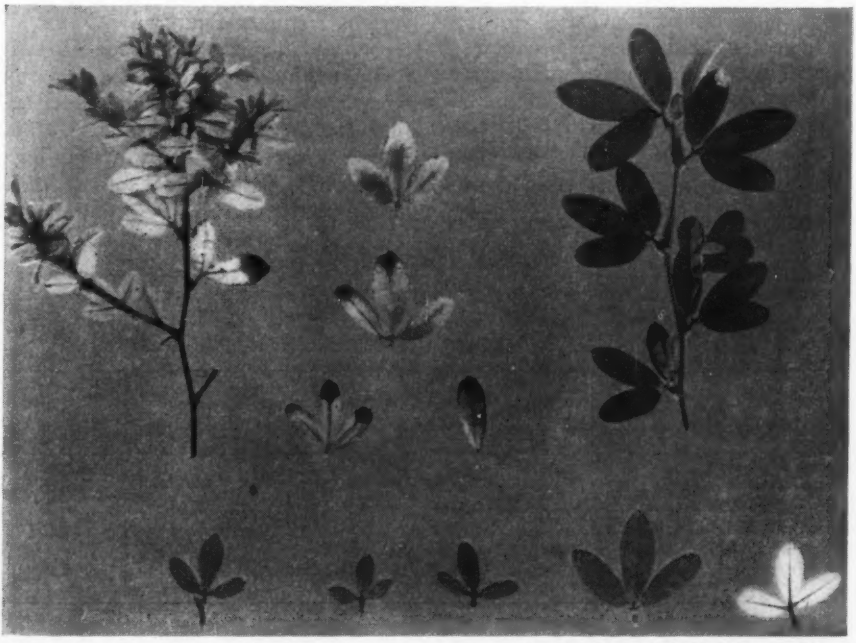

Fig. 5.—Potassium-deficient lespedeza plants and leaves as found when fertilized with a mixture of 1,500 pounds of lime and 72 pounds P_2O_5 per acre are shown in the upper left and center. Normal growth resulted when 36 pounds of K_2O per acre were supplied (upper right). Potassium-deficient plants were dwarfed in size; and the leaves were generally mottled and greenish-yellow in color, with subsequent burning or browning, starting at tips of leaflets (upper center). Gradual disappearance of chlorophyll and subsequent yellowing typify incipient potassium deficiency.

Fig. 6.—Lespedeza shows that high rates of rock phosphate, colloidal phosphate, or basic slag supply phosphorus and calcium needs. Kobe lespedeza plants typify fertilizer treatments:—left to right—(1) 1,500 pounds ground limestone and 450 pounds 0-16-8; (2) 4,500 pounds rock phosphate and potash; (3) 3,000 pounds rock phosphate and potash; (4) 3,000 pounds of colloidal phosphate and potash; and (5) 1,000 pounds basic slag and potash, all rates per acre. From Plummer soil series near Orlando, Florida.

the Leon fine sand, phosphorus stimulated nitrogen fixation, as evidenced by increases of phosphorus content of lespedeza and accompanying increases in nitrogen content.[1]

Four lespedeza varieties, namely, Kobe, Korean, Common, and Tenn. #76, were tested on several soils with various fertilizer mixtures. Common, Kobe, and Tenn. #76 made satisfactory growth and reseeded satisfactorily when grown for hay. Kobe lespedeza furnished higher yields than the other lespedeza varieties when grown for hay. Since Kobe does not tolerate as close grazing as Common, a 50/50 mixture

(*Turn to page* 41)

[1] Deficiency Symptoms and Chemical Composition of Lespedeza as Related to Fertilization, Jour. Amer. Soc. of Agron. 34:222-27, 1942, Blaser, R. E., Volk, G., and Stokes, W. E.

TABLE 1.—CHEMICAL COMPOSITION OF LESPEDEZA AS INFLUENCED BY LIME AND FERTILIZER MIXTURES DURING 1940

Leon Fine Sand, Gainesville, Florida

Fertilizer Applied, Lb./A.	Calcium Per cent	Phosphorus Per cent	Potassium Per cent	Protein Per cent
450# 0–16–8	.928	.154	.293	13.6
Lime and 450# 0–16–8	1.014	.175	.378	15.8
Lime and 75# Potash	1.071	.115	.354	12.3
Lime and 450# Superphosphate	.889	.200	.223	14.9
No Fertilizer	.571	.122	.311	11.5

Fertilizer and lime were applied in 1939.
Lime—1,500 pounds ground limestone per acre
Potash—(50% K_2O)
Superphosphate—(16% P_2O_5)
The mean differences for treatments in calcium, phosphorus, potassium, and nitrogen content are significant as computed by the "F" test of the analysis of variance method.

The Nutrition of the Corn Plant

By H. J. Snider

Illinois Agricultural Experiment Station, Urbana, Illinois

FERTILIZATION of the corn crop probably began with the American Indian when he put a dead fish in each hill of corn and produced a larger yield of grain by so doing. In the light of present-day knowledge, we must admit that this was a rather sound practice, although it was instituted by a race who had, at least temporarily, lost its power for material and spiritual advancement and, consequently, was at a low level of civilization. However, the race of people who has the ascendancy on the continent at the present time is still struggling with the problem of proper fertilization of the corn plant. One phase of the present-day problem is to try to make some of our thin land produce higher yields and to maintain a relatively high productive level on the more fertile soils.

In addition to producing enormous quantities of corn, the corn belt also produces large amounts of pork, beef, and other animal products. This means that a large proportion of the corn is fed on farms and another large portion goes on the cash grain market to be used in the making of various corn products. Whatever is the ultimate use of the grain, the fact remains that each year there is removed from corn-belt land large quantities of corn. Each bushel that leaves the farm takes along its toll of fertility of the soil. In addition, corn is a cultivated crop which exposes the land to destructive erosion for several months each year, which in turn also takes a toll of fertility.

More corn and corn of higher quality may be obtained from each acre and substantial profit may be made from such increase in yield and quality if careful consideration is given the management of the soil. The manner in which soil management affected the composition and growth of the corn plant during its growing and reproductive stages is shown in Tables 1 and 2. The soil represented in Table 1, Sparta Experiment Field, is one of relatively low productivity; that in Table 2, Stroh Farm, is of relatively high productivity. The values used in these tables are necessarily based on a small unit of weight, the milligram (mgm.). The relative smallness of the milligram may be illustrated by the fact that it requires 28,300 milligrams to make one ounce. However, when these data are used as a means of comparison, they may convey a rather vivid picture of the relative uptake of the three important plant-food elements at important and critical stages in the development of the plant.

Total amounts of nitrogen, phosphorus, and potassium taken up by the plant during the early growth up to June 30 were relatively small, although there were large variations in growth and plant composition where soluble fertilizers had been applied on both soils. Apparently, the soluble plant food in the fertilizers was very readily taken up by the young plants and this gave an early advantage in chemical composition and growth. The proportion of this early advantage, or the same ratio in growth and composition, was not held throughout the season. For example, in Table 1, June 23, the amounts of dry matter, nitrogen, phosphorus, and potassium were four to

Corn on the Stroh Farm—that on the left was untreated, that on the right received fertilizer, hill-dropped.

six times greater where the 0-20-20 fertilizer was used, while on September 2 the differences were only two to three times as great. This held true also on the soil represented in Table 2. The plants on the soils without the soluble fertilizers came on slower and were later in maturing.

Comparing the results in these two tables near the end of July, which represents about the beginning of the reproductive or ear-forming stage, the differences in the total amount of plant growth, nitrogen, phosphorus, and potassium were relatively small. There was considerable similarity in growth and composition at this time. The Sparta field, treated with RL-0-20-20, on July 30 had dry matter 212,000, nitrogen 3,140, phosphorus 440, and potassium 2,350 in milligrams per plant. The Stroh farm, treated with 0-20-0, on July 23 had dry matter 175,000, nitrogen 3,810, phosphorus 470, and potassium 4,100 milligrams per plant. Up to this point, these two corn crops were approximately equal. The Sparta soil was very deficient in available potassium and the amount added by the fertilizer was apparently not sufficient to maintain a high content in the corn plant.

A further examination of these data near the first of September showed that the critical period for this corn came during August. The corn plants which late in July were nearly equal in growth and chemical composition were wide apart in these respects by the early part of September. On September 2 the Sparta plants (RL-0-20-20) had dry matter 335,800, nitrogen 3,640, phosphorus 510, and potassium 2,710 in milligrams per plant. Plants from the Stroh farm (0-20-0) on September 5 had dry matter 595,200, nitrogen 9,530, phosphorus 1,370, and potassium 6,220 in milligrams per plant. Apparently, the Sparta soil reserve was largely used by July 30 and the final yield was held down to 36 bushels, while on the Stroh farm, where the reserve of plant food was ample, the corn yield reached the 100-bushel mark.

Lack of reserve plant food at this critical time may be illustrated by another comparison on these two fields. The corn plants on the Sparta soil, treated with RL-0-20-20, by July 30 had taken up 86 per cent of the available nitrogen, phosphorus, and potas-

sium, leaving only 14 per cent to be drawn upon for the ear-forming stage during August. Where superphosphate was added on the Stroh soil, by July 23 the corn plants had used only 40 per cent of the available nitrogen and phosphorus, and approximately 70 per cent of the available potassium. This left the corn with a relatively large reserve to draw on for the ear-forming stage. The success of the corn on the Stroh farm apparently lay in the fact that after the phosphorus deficiency in the soil was made up, there was a relatively large supply of nitrogen and potassium. It was this reserve, available during the ear-forming stage, that brought this corn yield up to a relatively high level.

These data indicate quite strongly that the Stroh soil may soon reach the point where a potash deficiency will limit the corn yields unless this element is supplied.

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TABLE 1—TOTAL AMOUNTS FOUND IN CORN PLANTS FROM EARLY GROWTH TO MATURITY MILLIGRAMS PER PLANT

Sparta Experiment Field 1941

Date of determinations	Soil treatment	Dry matter mgm	Nitrogen mgm	Phosphorus mgm	Potassium mgm
June 23	Residues	3,730	90	9	50
	Res. lime	3,770	130	13	30
	Res. L–0–20–20	18,150	510	50	340
July 30	Residues	57,600	960	130	580
	Res. lime	98,500	1,710	200	800
	Res. L–0–20–20	212,000	3,140	440	2,350
September 2	Residues	134,000	1,230	300	1,080
	Res. lime	250,000	1,910	370	1,750
	Res. L–0–20–20	335,800	3,640	510	2,710

Dry matter represents entire corn plant above ground.
0-20-20 put on 500 pounds per rotation; 200 pounds for each wheat crop, and 100 pounds for corn. All broadcast.

TABLE 2—TOTAL AMOUNTS FOUND IN CORN PLANTS FROM EARLY GROWTH TO MATURITY MILLIGRAMS PER PLANT

Adolph Stroh Farm, McLean County 1941

Date of determinations	Soil treatment		Dry matter mgm	Nitrogen mgm	Phosphorus mgm	Potassium mgm
		lbs.				
June 30	None		9,040	300	20	420
	0–20–0	150	39,230	1,150	70	1,710
July 23	None		58,930	1,610	170	2,240
	0–20–0	150	164,450	3,220	310	4,230
	0–20–0	500	175,000	3,810	470	4,100
September 5	None		447,900	6,810	580	4,920
	0–20–0	150	562,800	8,040	860	5,970
	0–20–0	500	595,200	9,530	1,370	6,220

0-20-0 150 pounds hill-dropped at planting time.
0-20-0 500 pounds broadcast before planting time.
Dry matter represents entire corn plant above ground.

Fig. 1.—Chippewa potatoes on Iron Age Farms, Grenloch, N. J., fertilized with 1,000 lbs. 5-10-10 by Hi-Lo band method.

Some Experiences in Applying Fertilizer

By S. D. Gray

Washington, D. C.

THE importance of proper application of fertilizer was first impressed upon my memory some 35 years ago. My father, a large tobacco grower and a liberal user of commercial fertilizer, pointed out to me several rows of tobacco to which no fertilizer had been applied and asked me to help him make a stand count. Where no fertilizer was applied, there was almost a perfect stand. On the balance of the field, even though replanted three times, there was scarcely an 80 per cent stand, and that irregular in growth. It was the common practice on most farms at that time to put the total amount of fertilizer in the row at the time the rows were bedded. I persuaded my father to compare this practice with (a) all fertilizer broadcast with grain drill and (b) two-thirds with drill and the balance in the row as ordinarily applied. The results were astounding. Broadcasting eliminated the need for replanting, but plants grew off slowly. Where part of the fertilizer was drilled and part placed in the row the stand was good and plants made more rapid growth and matured earlier. Thus this simple experiment marked the beginning of my interest in fertilizer application, an interest which subsequent experiences as a teacher and investigator have only tended to intensify.

Some years later while at the University of Puerto Rico as soils and crops instructor, further studies were inaugurated on sugar cane, tobacco, Guinea Grass, and Para Grass. The plan briefly was (a) all fertilizer plowed down in preparation of the soil, (b) half plowed down and half after plowing, and (c) all on the surface. In all

of these cases the best results came from plowing down half of the fertilizer, with the balance worked into the soil just before planting. Similar studies were made on turf seeding at the Arlington Experimental Farm in Virginia in 1916. Here it was quite clear that better rooting, greater drought resistance, and improved vigor attended all efforts to incorporate the fertilizer with the soil. These early studies resulted in general acceptance of the deep incorporation principle for turf fertilization, and perhaps in some degree the subsequent intensive pasture fertilization program.

During the five years, 1920-1925, when I was in charge of soils, crops, and farm management instruction at the State Institute of Applied Agriculture at Farmingdale, New York, my attention was directed largely to potatoes. Potato planting at that time involved two operations. First, the fertilizer was applied by use of the Eureka two-row distributor. Second, the potato planter followed, placing the seed in the marked rows and covering them. With this practice, poor stands were general except in years of abundant rainfall during the early growth period. Because of my interest in better instruction, as well as in growing better potatoes at the Institute, field and greenhouse studies were undertaken. The field work was a comparison of the standard practice described above with deep placement of three-fourths of the fertilizer with a disk drill and one-fourth in the usual way. The latter method was significantly better in all trials. In the greenhouse studies flats one foot deep and 30 inches wide were used. Fertilizer was applied at standard rate of application as follows: (1) all mixed with entire soil mass before filling flats, (2) all in row as in standard practice, (3) three-fourths mixed with soil and one-fourth in row and (4) all fertilizer in trenches five inches deep and five inches each side of row immediately after planting. While the differences in yield under controlled conditions were not large or of high significance, it was easily possible to rate the practices in the order of 3, 4, 1, 2.

From 1925 to date, my personal experiences with fertilizer application studies have been almost entirely in connection with my work as an agronomist for the potash industry. From the first, my attention was directed to the problem of studying the relation of

Fig. 2.—This poor stand and retarded growth of tomatoes resulted from row application of fertilizer.

Fig. 3.—Excellent stand and growth resulted where nitrogen and potash were plowed under and all phosphorus mixed with soil in the row.

methods of application to the efficient use of potash. Results of official experiments in widely separated areas with varying amounts of potash and numerous crops had not been too encouraging. That many of the negative results of previous efforts to increase the potash content of fertilizers was due to lack of knowledge on how best to apply it has been convincingly shown by more recent experiments and by farm practice where improved methods of applying fertilizer have been employed. There can be no question but that the present interest and status of fertilizer application are attributed to the splendid work of the National Joint Committee on Fertilizer Application.

In my studies with potash, the standard recommended analyses, rates, and methods of application have been the basis in all studies. These have been compared with higher potash analyses, everything else being constant. Parallel to this, equivalent increases in potash have been superimposed on the basic treatment as pre-applications plowed down or disced into furrow slice and as deferred applications. Taken as a whole, this extra potash whether applied before or after planting has given better results than in mixed goods. While the results do not justify the conclusion that separate application of potash is always the best method, they do suggest the need for further studies on methods of application in order to increase the efficiency of all of the major elements in mixed fertilizers. Such studies are now in progress in many states and there is much evidence that present methods of application may soon be greatly modified.

Some recent work carried on in cooperation with the Pennsylvania Cooperative Potato Growers' Association was summarized by the writer in the January 1941 issue of "The Guide Post." Table 1 gives the average yields for the treatments employed for the four-year period, 1937-1940, on 12 farms representative of the important potato-growing areas in Pennsylvania.

Previous trials having shown that potato fertilizers in a 1:3:3 ratio by band method of application had generally out-yielded those in the 1:2:2 ratio, and because we desired information on the efficiency of both extra potash alone and extra phosphorus with potash when disced into the soil, the layout employed

TABLE 1.—AVERAGE 4-YEAR RESULTS FOR PENNSYLVANIA POTATOES

Plot	Fertilizer*	Yield bu. per acre	Bushels increase over basic treatment
1	5–10–10	247.80	
2	Basic treatment plus 150 lbs. 60% muriate	285.92	38.12
3	Basic treatment plus 300 lbs. 60% muriate	259.60	11.80
4	0–10–10**	273.29	25.49

* Basic treatment in amount to supply 200 lbs. total plant food.
** Sufficient to raise 1:2:2 to a 1:3:3 ratio.

seemed logical. The results speak for themselves.

In 1942, band method of applying fertilizers to potatoes was compared with three-fourths plowed under and one-fourth in the row (banded) at planting time. Results of this work as well as a comparison of three much discussed potato analyses are presented in Tables 2 and 3.

It is interesting to note that with all analyses where the standard method of application was used, the extra potash significantly increased the yield. The low yield for extra potash in Plot 4 is attributed to poor drainage on part of the plot.

On a timothy sod field adjacent to the above, a 4-12-12 fertilizer at the rate of 1,000 pounds per acre was applied as follows: (a) all in band, (b) three-fourths plowed down and one-fourth in band. An average of four replications showed a yield of 321.16 bushels for the band method and 374.19 bushels where three-fourths was plowed down. To determine whether additional phosphorus and potash would increase the yields, one half of each of the above plots had 500 pounds of an 0-12-12 broadcast before plowing. On the area where basic treatment was in bands no increase was recorded, in fact there was a decrease of 1.36 bushels. On the plowed-down plot, however, the extra application of 0-12-12 all plowed down gave an additional increase of 18.04 bushels, or a total increase over the all-band method of 71.07 bushels.

At the Hershey Estates at Hershey, Pennsylvania, B. A. Rockwell has conducted numerous experiments with potatoes, vegetable crops, alfalfa, and corn. His results, particularly on potatoes,

TABLE 2.—1942 POTATO FERTILIZER EXPERIMENT, NATIONAL FARM SCHOOL, DOYLESTOWN, PENNSYLVANIA

Plot	Fertilizer analyses	Rate applied	Yield—Bushels per acre standard method	Yield—Bushels per acre plus 200 lbs. muriate broadcast
1	4–8–8	1,000	177.8	202.2
2	4–12–12	1,000	158.5	180.4
3	4–16–16	1,000	155.8	215.9
4	4–12–12*	1,000	215.9	174.9

* 800 lbs. plowed down, 200 lbs. in bands.

TABLE 3.—1942 POTATO FERTILIZER EXPERIMENT, PHILADELPHIA COUNTY PRISON FARM, TORRESDALE, PENNSYLVANIA

Plot	Fertilizer analyses	Rate applied	Yield—Bushels per acre standard method
1	4–8–8	1,000*	453.7
2	4–12–12	1,000	595.8
3	4–16–16	1,000	497.4

Note: Soybeans and 10 tons manure plowed down.

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Watch those hands!

Wartime Accidents Endanger Crops

By C. B. Sherman

U. S. Department of Agriculture, Washington, D. C.

ACCIDENTS on the farms loom as a potential menace to production. The danger intensifies as war conditions intensify. Our farmers have proved once again that they can top all records in growing crops. Harvests showed that better crops became best under the spur of war. But among the deterrents, an inevitable increase in farm accidents lurks ahead.

For at the same time that farmers are necessarily welcoming to their fields and orchards hundreds of inexperienced school boys, women used to working only in the farmhouses, and older, unsure people, their machinery and tools are growing old. Repair parts are hard to get, repair men are scarce, and speeded-up farm work on huge war crops means sleepiness and exhaustion, even among the reliable workers and the leading farmers themselves. Meanwhile, the growing lack of civilian doctors and public-health nurses heightens the potentialities of loss.

Besides the worry and family and medical expense that bad accidents bring in their trail, there is always the danger of a lost crop for lack of cultivation, or fertilizing, or spraying, or harvesting—at just the right time. Either a broken back or a badly broken instrument can bring a huge dent in a farm's contribution to Food for Freedom.

Farm accidents are all too frequent at best. Farmers are injured more often, relatively, than workers in other occupations, yet less is done about prevention and safety on farms than in mines and factories. If there are 4,500 accidental deaths among farm workers

in one year, as figures suggest, this means one fatality a year to each 2,500 workers. The number of accidents that are not fatal to man but may be fatal to crops must be tremendous. One localized study indicates that there are about 14 accidents that cause loss of work to every fatality. Another study says 157 to every fatality. Other local studies bring results somewhere between these. More and better figures are needed and what these figures will be under wartime exigencies is yet to be recorded.

Too little is known about causes and costs. Such figures as are collected are not comparable so no national totals are satisfactory. Inadequate figures gleaned from workmen's compensation claims in various states usually make some effort to separate immediate causes from motivating causes. Apparently, the former rate has been in about this descending order of frequency in the past: falls, animals, struck by objects, machinery, automobiles, strains, cuts and bruises, diseases, and other infections. The miscellaneous group is always large. Back of these causes are unavoidable conditions, carelessness, defective farm equipment, vicious animals, sleepiness and exhaustion, and other difficulties in that order.

A uniform system of reporting the kind of farm accidents and attendant details is a dire need. The U. S. Department of Agriculture has worked out and issued a suggested form. A fall, for instance, is not a primary cause —it is one type of accident. A report of injuries caused by falling from a ladder often fails to state the condition of the ladder or whether it was carelessly placed.

Costs are beyond measurement at present. More information is needed before they can be even estimated with any degree of satisfaction. Even then, the intangible cost to society in anxiety, pain, and worry will never be known, and real costs must make some recognition of this phase.

From a merely monetary viewpoint, this one fact may be significant. Indemnities in farm accidents paid on the Pacific Coast showed these averages: $59 for a fall; hurt by farm animal, $39; machinery, $34; hurt from handling an object, $30; hand tools, $24.

Most figures on farm accidents are fragmentary. We need more. Then we need to study them to see what they mean and what to do about it.

Preventive measures should be dramatized. If prevention could be as exciting as the accidents themselves, if knots of people would gather swiftly to discuss eagerly every detail of proposed preventive measures as they do about a victim and how it happened, the menace of accidents might be speedily reduced. We don't see just how to do that vitalizing, but many agencies are diligently at work on prevention and the sum total of all their work is bound to tell.

The National Safety Council in 1942 sponsored the first National Safety Conference on home and farm accident problems. At the request of the President of the United States that it conduct "a concerted and intensified campaign against accidents" it is emphasizing the manifold needs connected with farm safety and is helping to get at

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Is the ladder safely placed?

Boron in Agriculture

By E. M. Kitchen

New York, N. Y.

(Paper presented before Division of Fertilizer Chemistry, American Chemical Society, Buffalo, September 1942)

THE increased interest in the boron-deficiency work has resulted in symptoms of deficiency being described on 34 crops. Most of the intensive investigational work has taken place during the past six years. The early turnip, apple, and cauliflower tests were the forerunners of the table beet, tomato, sugar beet, flax, mangel, celery, cabbage, etc., and most recently of the legume tests with alfalfa outstanding. Red clover, crimson clover, and ladino clover are being checked for response to boron at the present time, but no published information from U. S. stations is yet available.

It does not seem necessary to review the earlier developments of boron deficiency since so much has been published and nearly everyone is familiar with the literature.

One of the important developments during recent years has been the legume crops. While the first work on alfalfa, in this country, was done in 1936, there was a lapse of three years before more work was published. In 1937, Willis and Piland (1) of North Carolina, and McLarty (2) of British Columbia, attributed "alfalfa yellows" to boron deficiency. They corrected the trouble with 5 to 10 pounds of borax per acre.

The symptoms given by the investigators (1, 2) were very similar. The later investigators have found the symptoms to be the same in all sections of the country and in Canada. The yellowing of the terminal growth, shortening of internodes, rosetting of terminal growth, and death of terminal buds are the characteristic symptoms of boron deficiency. The boron yellowing is generally confined to the upper portion of the plant. Potato leafhopper yellowing, according to Colwell and Lincoln (3), is hard to distinguish from boron deficiency yellowing as far as color is concerned. The leafhopper yellowing may give a streaked appearance in which the veins and mesophyll adjacent to them remain green. The yellowing may also take place at the distal portion of the leaf as a "V" in which the apex represents the point of feeding, and the sides are bound by veins extending to the edge of the leaf. In other cases the yellowing may be more uniform, and from this standpoint alone cannot be differentiated from the uniform yellowing of boron deficiency. There might also be a pronounced boron deficiency with little or no yellowing.

The distribution of discoloration is one of the most important factors for distinguishing between the two types of yellows. The leaves injured by leafhoppers occur at various heights on a given shoot, while the yellowing or reddening caused by boron deficiency is always confined to terminals. There is another type of yellowing associated with common leaf spot caused by Pseudopeziza medicaginis. This organism occurs as small, circular, dark brown spots on the lower leaves of the alfalfa, and if sufficiently severe, causes them to turn yellow and drop.

Alfalfa yellows has been worked with in several states and Canada. Ewen at Guelph, Ontario, and Dr. Stevenson at Ottawa have found borax to be very effective on alfalfa yellows. McLarty, Wilcox, and Woodbridge (2) in British Columbia, Willis and Piland (1) also Piland and Ireland (3) of North Carolina, Hendricks (4) of Tennessee, Grizzard and Matthews

(5) also Hutcheson and Cocke (6) of Virginia, Midgley and Dunklee (7) of Vermont, Powers (8) of Oregon, Colwell and Baker (9) of Idaho, Colwell and Lincoln (10) of New York, Donaldson (11) of Massachusetts, Brown and King (12) of Connecticut, Baur, Huber and Wheeting (13) of Washington, and Cook (14) of Michigan, have found borax to be very effective in controlling yellows.

Fewer Weeds and Increased Yields of Alfalfa

The rates of application of borax vary from 15 pounds per acre up to 40 pounds per acre. Colwell and Baker (9) found that around 40 pounds of borax gave good results on Idaho soils. In most of the eastern states the range of 15 to 30 pounds per acre seems to give the best results. The tolerance of alfalfa to borax is quite high. Several investigators have applied as much as 100 pounds per acre, in some cases more, without any toxicity.

One feature that has been noted is the fact that borax-treated plots have a much lower weed count than untreated areas. Hutcheson and Cocke (6) found that in dry seasons, when the yellows seem most severe, a heavy growth of crab grass and other late summer weeds crowd out and replace the weakened alfalfa plants. The author noticed this condition in North Carolina. The treated plots were free of weeds while the balance of the field was infested with crab grass and foxtails. Tests in Tennessee and other states bear out this fact quite well. Authorities believe that the healthy, thick growth does not allow weeds to become established and a "weed free" stand is maintained. It is not likely that the amount of borax used is toxic to the annual weeds.

Boron deficiency has a definite bearing on the life of the alfalfa fields. In the western states it is not unusual for a field of alfalfa to last 8 to 10 years and even more. This is not the case with most of the eastern states. Hendricks (4) finds that in the second or third year the alfalfa often seems to have a hard time surviving the hot, dry periods of late June, July, or August; it then grows slowly, the leaves turn yellow, and the summer showers seem to grow crab grass better than alfalfa. Hutcheson and Cocke (6) found that in the eastern section of Virginia, they could grow alfalfa producing high yields by using adapted seed, lime, and rather heavy applications of mineral fertilizer. These stands only persisted for short periods, usually being reduced to such an extent that they became uneconomical by the end of the second year. In tests at Chatham they found that the borax-treated areas gave vigorous growth, and good stands were being maintained, while the untreated areas were deteriorating rapidly and would appear to be too thin for profitable production during the third year of growth.

Increases in yields of alfalfa from borax applications have been reported from every state that has conducted tests. Colwell and Baker (9) of Idaho report that as a result of their tests they conclude that many of the soils in northern Idaho are deficient in boron for alfalfa, and that substantial increases in yields can be obtained by the addition of borax. Baur, Huber, and Wheeting (13) of Washington report that although yields varied in several fields because of different soil fertility and management practices, increases in yield were obtained on all plots that had received borax. The size or magnitude of the increases from borax applications were proportional to the severity of the deficiency. Greater increases in yields from additions of borax were generally obtained from fields in a comparatively high state of fertility than from applications to poorer soils, and the addition of borax to manured fields on boron-deficient soils increased growth materially when compared to manure applications alone.

Powers (8) of Oregon states there are 50,000 acres of alfalfa in the Willamette Valley that will yield ½ to 1

ton more an acre from a 30-pound-per-acre borax application. Midgley and Dunklee (7) found that on one soil type, mineral fertilizers without borax were ineffective for the production of alfalfa. In conjunction with borax, however, alfalfa yields doubled with practically all cuttings. When 40 pounds of borax per acre were applied, the yield was much superior to that secured when less was applied. Hutcheson and Cocke (6) in their tests at Williamsburg, Virginia, found that 10 pounds of borax at time of seeding in the fall of 1939 gave a marked increased yield from each of the five cuttings in 1940 and gave a total increase of 4,693 pounds of field-cured hay per acre. The spring seeding, with 10 pounds of borax per acre plus fertilizer, gave a total increase of 4,517 pounds of field-cured hay per acre for four cuttings. At Chatham, Virginia, borax was applied immediately following the first cutting at the rate of 15 pounds per acre and the second cutting was increased over 600 pounds per acre as against the check area.

Investigators have found consistent increases in hay fields from relatively small applications of borax.

Soil Types and Methods of Application

Soil types do not determine the occurrence of alfalfa yellows or response of alfalfa to borax applications. In general, the lighter soil types give a more consistent response to borax applications. However, the author saw yellows on alfalfa growing on delta soil in Tennessee and saw one of the worst cases of yellows on a Hachi River bottom soil. The Hachi soil responded very well to 20 pounds of borax per acre and yellows were eliminated.

The effect of borax applications on the seed set of alfalfa has been noted in New York, Vermont, Virginia, North Carolina, Tennessee, Alabama, and Canada. In 1940 Midgley and Dunklee (7) found that the borate-fertilized second crop of alfalfa, which had been allowed to go to seed, produced more than 35 times as much seed as the unborated check plot. Piland and Ireland (3) found where they had omitted the usual first cutting, blossoming occurred with little or no difference in the growth between the borax-treated and non-treated plot, except for yellows on the no-borax area. Later, it was observed that a good seed set was being obtained where the borax had been applied. A sample of seed from the borax treatment gave a germination count of 76%; hard seed, 24%.

Grizzard and Matthews (5) observed that the borax-treated areas at Williamsburg, Virginia, blossomed very profusely while the no-borax plots blossomed very sparingly. They believed this might have a bearing on the seed set of the crop and began work on it. They left strips across borax-treated and non-treated plots which were not cut at time of second cutting. During the blossoming period, 31 days, they had 7.14 inches of rain with an average daily temperature of 87°F. The no-borax plots did not yield any seed whatever while the 15 pounds of borax per acre plots gave from 109.7 to 132.2 pounds of seed per acre. Germination counts ranged from 71% to 75%; hard seed from 24% to 28%. The findings on seed set are of importance because it may now be possible to breed adapted strains for the various states with varied conditions. It may also be possible to obtain two cuttings of hay and one crop of seed each year. Further work is being done along these lines.

Methods of application for the small amounts of borax used are varied. Many farmers use the common cyclone hand seeder which may be set to deliver 20 pounds of borax per acre. Others mix the borax with 50 or 100 pounds of sand and broadcast it. Some fertilizer companies are putting out a special alfalfa mix that contains from 60 to 200 pounds of borax per ton. The mix is then used at time of seeding or as a topdresser. The bags are

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Above—This group of fertilizer and Soil Conservation Service officials early in October made a 2-day tour through South Carolina and Georgia to study the Soil Conservation district program. The group here is discussing the importance of annual lespedeza in a crop rotation and its value as hay crop.

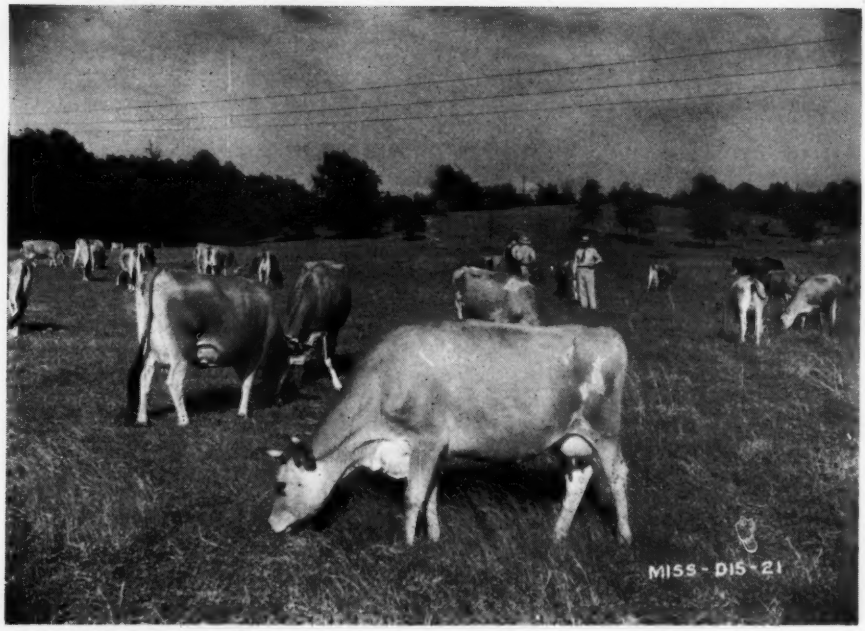
Below—R. Y. Bailey, Dr. T. S. Buie, and Remo Molinaroli, all of the Soil Conservation Service, are here leading the discussions regarding this land which produced five bushels of corn per acre before it was planted to kudzu four years ago. It has been cut for hay this year with a yield of 218 bales from 16 acres.

Above—Last year a good hay crop—this year seed will be harvested from this 3-year-old field of sericea lespedeza. Members of fertilizer group in foreground are: M. H. Lockwood, Eastern States Farmers' Exchange; Dr. J. W. Turrentine, American Potash Institute, and H. R. Smalley, National Fertilizer Association.

Below—An excellent crop of barley following a 2-year growth of annual lespedeza in a strip rotation of grain, lespedeza, and row crops. All rotated crop land is terraced, alternate strips between terraces being planted to cotton. In foreground, Remo Molinaroli and C. W. Boozer, work unit conservationists.

Above—More than a bale of cotton per acre will be harvested here following annual lespedeza in a strip rotation of legumes, grain, and row crops. Examining the cotton are: Leroy Donald, Barrett Company; H. R. Smalley, National Fertilizer Association; and Dr. T. S. Buie, Soil Conservation Service.

Below—Standing on the dam of a small farm pond, the fertilizer and Soil Conservation Service officials discuss the system developed for irrigating 35 acres of upland pasture with surplus water from the pond. Water is evenly distributed over pasture area through small channels constructed on the contour.



Above—More than 100 gallons of milk daily are sold from this purebred herd of Jersey cows on the farm of the Johnson Brothers, who are cooperators in the Northeast Mississippi Soil Conservation District. The pasture was improved by use of lime, fertilizer, and the proper seeding of legumes and grasses.

Below—Grazing kudzu is one of the most profitable and popular practices on the dairy farm of Asbury D. Wright, Gainesville, Ga. This three-year-old kudzu is growing on a worn-out portion of the farm which was formerly used for row crops. The luxuriant growth of this kudzu field is ample proof of its adaptability.

The Editors Talk

Fertilizer Supplies

The fertilizer situation is far more encouraging today than it was six months or even a year ago. Drastic steps have been taken to guard our plant-food resources and to speed up production wherever feasible. Federal and state fertilizer specialists in cooperation with the War Production Board, Office of Price Administration, and the fertilizer industry have developed and put into operation plans to aid in making the most efficient use of essential plant foods and to insure their equitable distribution.

The basic provisions of the plans developed were published as War Production Board Conservation Order No. M-231, dated September 12, 1942. With the vastly increased military demand for chemical nitrogen for munitions and the unprecedented demand for production of essential crops, available supplies had to be conserved in the best public interest and to promote the national defense. The order, therefore, not only restricted the use of chemical nitrogen for each state, but established a list of fertilizer grades. Grades of fertilizer that will be available for farm use in 1943 will on the average supply less nitrogen than the average of all fertilizers sold last year. Where a particular grade was designated as available only for a particular crop, it was decreed that it should be sold or used only for the production of such crop.

In the opinion of the federal and state officials as well as industry, it is the consensus that the reduction of nitrogen thus effected would not seriously impair crop production. Particularly is this true where legume crops are grown under optimum fertility conditions with respect to lime, phosphorus, potash, and in some areas boron, the importance of which has been recognized and stressed by officials in charge of our national agricultural conservation programs. While the main objective of the official order was to make the limited supply of chemical nitrogen go around, it quite obviously also will result in effecting economy in manufacture and distribution as well as insure greater efficiency in use of the officially recommended grades.

Fortunately, for use on farm crops there will be available rather large supplies of organic nitrogen. Present indications are that upwards of 2,000,000 tons of vegetable meals will be available. Much of this no doubt will be used for stock feed, but it is believed that approximately 1,000,000 will find use as fertilizer. It should be emphasized that no restrictions have been placed on the ordinary sources of organic nitrogen, except that delivery of any mixed fertilizers, the nitrogen of which is entirely organic, is prohibited unless the nitrogen content is at least 3% and the total nitrogen, available phosphoric acid, and water-soluble potash content thereof is at least 14%.

The fertilizer industry has gone on record as approving the recommendations of the War Production Board and has pledged itself to distribute mixed fertilizers and nitrogen materials equitably among all fertilizer consumers. Their cooperation in this connection has therefore avoided the inevitable alternative government

rationing, which would undoubtedly have been cumbersome, expensive, and generally confusing and unsatisfactory both to industry and the individual farmer.

In 1943 all fertilizer sales will be on the historical basis. This means that fertilizer sales will be based on the history of past use by each farmer, information which must be supplied to the fertilizer dealer, agent, or manufacturer on special forms that have been provided. In making sales on this basis, preference will in all cases be given to crops designated as "essential war crops" by the U. S. Department of Agriculture. Form 1 is to be used for distribution of fertilizer to farmers who are able to supply full historical data as to grades and quantity used in 1941-42. Form 2 is for use where historic cases will not serve because of change of acreage during the 1942-43 season, and Form 3 is for use in making application for straight nitrogen materials. All in all, everything possible has been done to facilitate fertilizer distribution for the achievement of production goals in our Victory Food Program.

Of interest and most reassuring at this time is a summary of the fertilizer situation by Dr. Frank W. Parker, Head of the Division of Soil and Fertilizer Investigations of the U. S. Department of Agriculture. In a talk before the American Society of Agronomy at St. Louis on September 12, 1942, he told visiting scientists that "American farmers will be able to get most of the fertilizer they need to meet crop production goals next year." He predicted that with a record demand for fertilizer due to the great increase in farm cash income, there would be adequate supplies of both phosphate and potash, but not enough nitrogen to meet their demand. It was his opinion, however, that there would be enough nitrogen for all essential requirements for authorized crop production goals.

While pointing out that the fertilizer situation is always subject to change due to the war, Dr. Parker concluded: "It now appears that American farmers will use more phosphate and potash than they have used in any previous year, and that nitrogen consumption, despite war conditions, is expected to be higher than in any year prior to 1941.

War Work

With every conscientious person evaluating his contribution to the war effort, it is of interest to note the check-up of a million and a half 4-H Club boys and girls on their 1942 work. The results as released by the U. S. Department of Agriculture are amazing and proof that agriculture has its Young America thoroughly aroused to meet the emergency with an "all-out" spirit.

Since their enrollment last April, 4-H Club members have produced 3,000,000 bushels of vegetables in Victory Gardens. They raised 6,500,000 chickens, 300,000 hogs, 85,000 dairy cows, 11,000,000 pounds of peanuts and soybeans, and large amounts of other needed crops and livestock in their club projects.

Club members collected 146,000 pounds of scrap metal from their own and neighboring farms, bought $6,000,000 worth of war bonds, canned 14,000,000 jars of food, helped repair and operate farm machinery, improved their own health, made clothing materials go farther, and helped in many other ways, the report shows.

Nearly 500,000 club members were active in local fire prevention groups. An equal number helped in other rural civilian defense activities, such as acting as air raid spotters. Thousands took first aid and home nursing training.

While some of these boys and girls may not enroll in club work next year, the additional year of age on others insures a greater and more effective effort during 1943. That they will prove a most important factor in the shortage of experienced farm labor is obvious.

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

¶ With strict rationing of the limited supplies of nitrogen available and with fertilizers that are permitted to be manufactured and sold restricted to certain grades by the War Production Board, most Experiment Stations, after conferences with state agricultural officials and fertilizer manufacturers, have had to revise their fertilizer recommendations. Many of them have issued temporary recommendations designed to meet war conditions. The reduced nitrogen supply means this fertilizer will be used mainly on intensively grown crops while other crops will be expected to obtain their nitrogen from leguminous sods and green manures that are turned under. Great stress, therefore, is being made on the growing of legumes, and particularly on the use of lime, phosphate, and potash in proper amounts to assure the best possible growth of legumes and their greatest efficiency as nitrogen fixers. The fertilizer grades for the various crops usually are recommended with consideration of the fact that a legume must be turned under during the rotation. The limitation of permissible grades to certain approved analyses should work no hardship on farmers in most cases. In most states there is a sufficiently wide choice of analyses to meet the various requirements, and it is probable that a better adapted fertilizer is more likely to be used now than was the case in the past. The adequacy of our phosphate and potash supplies greatly simplifies problems as compared to what would prevail if all three of these nutrients were short in supply. The various publications are too numerous to be reviewed individually, but will be found listed each month as they appear.

¶ An interesting study of rotations and fertilizing systems in western Virginia is reported by W. R. Perkins, A. L. Grizzard, and T. B. Hutcheson in Virginia Agricultural Experiment Station Bulletin 339 entitled "Rotation and Fertilizer Experiments in Southwest Virginia." A three-year rotation of corn, wheat, and clover hay, in general, gave the best results. Substitution of barley for clover gave slightly lower yields of both corn and small grains. A five-year rotation consisting of corn, wheat one year each, and clover and timothy for three years also gave very good results and was considered to be adapted to beef cattle raising. The advantage of the short rotation course is the more frequent appearance of the legume. In the fertilization of the crops, best results usually were obtained from a complete fertilizer. Phosphorus was the first limiting element and nitrogen appeared to be the second limiting element, since potash, when used with phosphorus alone, frequently did not increase yield, while when potash was added to nitrogen and phosphorus, marked increases in yield were obtained, especially on corn and hay. While potash added to phosphorus alone did not increase yield, potash-deficiency symptoms began to appear on the phosphate alone plots as the experiment progressed. The authors conclude that the quickly available potash was being exhausted from this soil where no potash was applied in the fertilizer. Best results in practically all

cases were obtained when fertilizers were used in connection with lime and when they were used without the addition of lime. The authors conclude that on the soil in western Virginia, lime and a complete fertilizer should be used until the rotation is well established. After several legumes have been turned under, then probably lime, phosphate, and potash will be sufficient.

"Fertilizer Shipments in Arkansas by Counties for the Fiscal Year Ending June 30, 1942," Department of Revenues, Little Rock, Arkansas.

"Commercial Fertilizer Sales As Reported to Date for the Quarter Ended June 30, 1942," Bureau of Chemistry, Department of Agriculture, Sacramento, California, Aug. 17, 1942.

"Vitamin B_1 Claim Unacceptable," Bureau of Chemistry, Department of Agriculture, Sacramento, California, Oct. 8, 1942.

"Agricultural Minerals Registrants to Date for Fiscal Year Ending June 30, 1943," Bureau of Chemistry, Department of Agriculture, Sacramento, California, Sept. 18, 1942.

"Commercial Fertilizers Registrants to Date for Fiscal Year Ending June 30, 1943," Bureau of Chemistry, Department of Agriculture, Sacramento, California, Sept. 18, 1942.

"Fertilizer Grades for Connecticut in 1943," Dept. of Agron., University of Conn., Storrs, Conn., Oct. 1942, J. S. Owens.

"Commercial Fertilizers," Univ. of Idaho, Moscow, Idaho, Def. Cir. 11, Jan. 1942, G. Orien Baker.

"Commercial Fertilizers in Kentucky in 1941," Agr. Exp. Sta., Lexington, Ky., Reg. Series, Bul. 30, June 1942.

"Fertilizer Recommendations for Maine 1942–43," Agr. Exp. Sta., Orono, Maine.

"Commercial Feeds, Fertilizers and Agricultural Liming Materials," Univ. of Maryland, College Park, Maryland, Aug. Issue 1942, No. 183, Control Series.

"Fertilizer Recommendations for Fall Seeded Grains 1942," Soil Science Dept., Michigan State College, East Lansing, Mich., Aug. 1942.

"Substitutes for Nitrogen Fertilizers in Orcharding," Agr. Exp. Sta., Columbia, Mo., Cir. 236, June 1942, A. E. Murneek and A. D. Hibbard.

"Wartime Fertilizers for New Jersey," Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Cir. 452, Oct. 1942.

"Sale and Analysis of Commercial Fertilizers 1941," Dept. of Agr. and Markets, Albany, N. Y., Cir. 615.

"Report of Analyses of Commercial Fertilizers Sold in N. Y. State," Dept. of Agr. and Markets, Albany, N. Y., Bul. 337, Part I, March 1942.

"Report of Analyses of Samples of Lime Materials Used for Agricultural Purposes Sold in New York State July 1, 1940 to June 30, 1941," Dept. of Agr. and Markets, Albany, N. Y., Bul. 337, Part II, March 1942.

"County Fertilizer Data: Mixed Goods and Materials," July 1, 1941 through June 30, 1942, Dept. of Agr., Jackson, Miss.

"Fertilizer Recommendations for North Carolina 1943," Agr. Exp. Sta., State College Station, Raleigh, N. C., Cir. 130, Sept. 1942.

"Fertilizer Sales by Grade in Order of Tonnage, July 1, 1941-December 31, 1941," N. C. Dept. of Agr., Raleigh, N. C.

"Fertilizer Sales in Oklahoma by Counties, July 1, 1941-June 30, 1942," Okla. State Board of Agr., Feed & Fert. Dept., Oklahoma City, Okla.

"Field Test of Phosphate Fertilizers," Agr. Exp. Sta., State College, Pa., Bul. 423, March 1942, C. F. Noll and C. J. Irvin.

"The Orchard Fertility Problem During the War Emergency," Agr. Exp. Sta., State College, Pa., Bul. 431, August 1942.

"Fertilizers Sold in Pa. in 1941—Summary of Reports Sent by 45 Companies," Dept. of Agron., Pa. State College, State College, Pa.

"Inspection of Fertilizers," Agr. Exp. Sta., Rhode Island State College, Kingston, R. I., Annual Fert. Cir., March 1942.

"Shortage of Nitrogen Fertilizers," Agr. Exp. Sta., A. and M. College of Texas, College Station, Texas, 801 Progress Report, Sept. 26, 1942, E. B. Reynolds.

"Rotation and Fertilizer Experiments in Southwest Virginia," Agr. Exp. Sta., Blackburg, Va., Bul. 339, May 1942, W. R. Perkins, A. L. Grizzard, and T. B. Hutcheson.

"Virginia Field Crop Fertilizer Recommendations," Ext. Agron. Dept., Circular E-341 Revised, Sept. 1942.

"The Value of Liquid Manure as a Fertilizer for Pasture," Agr. Exp. Sta., State College of Washington, Pullman, Wash., Bul. 412, April 1942.

Soils

¶ There are two areas in Wisconsin devoted to the growing of cigar leaf tobacco. In order to obtain information on the status of soils on which the crop is grown, and to see whether differences in soil conditions could account for the higher prices usually paid for the tobacco grown in the northern area, soil samples and leaf samples were taken from a large number of representative fields, analyses were made, and results summarized. This work is presented by J. Johnson and W. B. Ogden in the Wisconsin Agricultural Experiment Station Research Bulletin 142 entitled "A Survey of Tobacco Soils in Wisconsin." It was found that

the soils in the northern tobacco growing area contained less clay, on the average, than the southern area soils. The higher content of clay is considered unfavorable due to reduction in available potash supply by absorption of this nutrient by the clay. The organic matter tended to be higher in the northern district, although in both sections there were fields where the organic matter was 6 to 7% by weight, a content considered to approach the undesirable range owing to possibility of excess nitrogen being furnished the crop late in the season by this organic matter. The northern soils tended to be less acid than those of the southern district although some areas in the northern district were very acid, and on such soils high quality tobacco was being produced. The authors ascribed this to the greater availability of potassium on such soils. The northern soils tended to be higher in total nitrogen, whereas, there was considerable variation in nitrate nitrogen. The authors bring out that if very heavy applications of manure are applied to supply nitrogen for tobacco, an unbalanced fertility condition is likely to develop in the soil because of insufficient potash, with quality and burn of the tobacco correspondingly reduced. The available phosphorus was higher in the northern area, but even here about 40% of the soil contained less than the 100 lbs. of available P_2O_5 considered the minimum desirable amount for tobacco. In the southern district, about 58% of the soils were below this figure. Some soils contained large enough amounts of phosphoric acid to approach what the authors believe to be the upper favorable limit, and on such soils neither phosphate fertilizers nor heavy manure applications are considered desirable without building up potash supplies. The authors believe that calcium and magnesium supplies in the soils do not present a problem. The chlorine content of many of the soils appeared to be higher than desirable for best quality tobacco. The remedy for this is given in the avoidance of heavy manure applications and of fertilizer carrying chlorine, coupled with the use of larger amounts of potash since this tends to overcome the undesirable effects of chlorine in the tobacco leaf.

The authors state that potassium is the most important nutrient in connection with the fertilization of tobacco owing to its great influence on quality. They believe that Wisconsin growers have not paid sufficient attention to the importance of this nutrient in growing their tobacco crops. The soils in the northern district, especially one area, tended to be higher in available potassium. Almost 60% of the soils in the southern areas showed less than 400 pounds of available potash per acre, which the authors feel is the minimum desirable amount. Since there is considerable variation in the desirable minimum due to other factors, such as chlorine content, clay content, and rainfall, they believe 70% of the soils in this district are too low in available potash to grow the best tobacco. It is believed the higher price paid for the tobacco in the northern area is due essentially to the greater amount of available potash present in the soils, and they point out that there is no fundamental reason why growers in the southern area should not be able to grow tobacco equally as good if sufficient care is given to the selection of the fields in which the tobacco is to be grown, and to its fertilization.

¶ Data on potash content of tobacco leaves and on the burn of the leaf showed that the leaf in the northern area was higher in potash and had better burn. The authors state that as a result of their work it would appear as though the leaf growing on the heavier soil type should contain at least 5% potash, whereas only about one-third of the crop contained more than 4% potash in the leaf. It is stated that the only practical way to increase the potash content of the leaf is to apply more potash to the soil, preferably by the use of potash fertilizers which may be supplemented with manure. No

potash or other fertilizers containing chloride should be used if it is desired to improve the burn of the leaf. The use of manure and leguminous crops and the problems which arise when they are grown in tobacco rotations are briefly discussed.

¶ "Using Crop Residues for Soil Defense," U. S. Department of Agriculture Miscellaneous Publication 494, by F. L. Duley and J. C. Russel presents important and practical information on how farmers can protect their soils by comparatively simple methods. It is surprising how easy it is to utilize material and equipment on the farm in such a way as to protect the surface of the soil, and it is the surface where erosion and other soil losses begin. The information is presented by the authors in the form of excellent illustrations, charts, and short descriptive sections.

"Soil Management in Food Production," Univ. of Idaho, Moscow, Idaho, Def. Cir. 9, January 1942, G. Orien Baker.

"Observations and Studies on the Peat Deposits of Louisiana," Agr. Exp. Sta., La. State Univ. and A. and M. College, Baton Rouge, La., La. Bul. 343, May 1942, W. R. Dodson.

"What Farmers Say About Soil Conservation," Md. State Soil Conservation Com., Bul. 2, April 1942.

"Soil Survey Clinton County Michigan."—U.S.D.A. Washington, D. C., Series 1936, No. 12, February 1942, G. A. Johnsgard, T. E. Nivison, H. T. Rogers, R. L. Donahue, J. T. Stone, G. M. Welles, M. M. Striker, J. W. Moon, and Z. C. Foster.

"Wind Erosion Control," Agr. Ext. Serv., Univ. of Minn., St. Paul, Minn., Ext. Bul. 235, June 1942, M. A. Thorfinnson.

"The Development of Loessial Soils in Central United States as It Reflects Differences in Climate," Agr. Exp. Sta., Univ. of Missouri, Columbia, Mo., Res. Bul. 345, June 1942, Harvey B. Vanderford and W. A. Albrecht.

"Land Use Experience in Callaway County, Missouri," Agr. Exp. Sta., Univ. of Missouri, Columbia, Mo., Res. Bul. 346, June 1942, A. M. Meyers, Jr. and Conrad H. Hammar.

"Physical and Chemical Properties of Soil Profiles of the Scott, Fillmore, Butler, Crete, and Hastings Series," Agr. Exp. Sta., Univ. of Nebraska, Lincoln, Nebraska, Res. Bul. 126, June 1942, Henry W. Smith and H. F. Rhoades.

"Preventing Soil Losses During Fall, Winter, and Spring," Cornell Univ., Ithaca, N. Y., Bul. 515, June 1942, Warren C. Huff.

"The Effect of Soil Texture and Slope of Land on Productivity in Two North Dakota Counties," Agr. Exp. Sta., N. Dak. Agr. College, Fargo, N. Dak., Bul. 315, June 1942, W. M. Johnson and C. F. Bortfeld.

"Erosion on Vermont Permanent Pastures," Agr. Exp. Sta., Univ. of Vt., Burlington, Vt., Bul. 483, March 1942, A. R. Midgley, C. V. Plath, and J. J. Mayernik.

"Using Crop Residues for Soil Defense," U.S.D.A., Washington, D. C., Misc. Pub. 494, Aug. 1942, F. L. Duley and J. C. Russel.

"Soluble Material of Soils in Relation to Their Classification and General Fertility," U.S.D.A., Washington, D. C., Tech. Bul. 813, June 1942, M. S. Anderson, Mary G. Keyes, and George W. Cromer.

Crops

¶ With the increased demand in recent years for long staple cotton, interest in the growing of Sea Island has revived. With war requirements making an even greater demand for long staple cotton, the growing of Sea Island assumes great importance as part of our war effort. Georgia Coastal Plain Experiment Station Bulletin 33, "The Growing of Sea Island Cotton in the Coastal Plain of Georgia," by J. G. Jenkins, therefore, is very timely. Great stress is put on the importance of good seed and proper varieties. In the fertilization of the crop, an analysis to 3-8-8 and a rate of 300 to 500 pounds per acre are given as a general recommendation. On new land 3-12-8 is suggested. Owing to the longer season needed to mature Sea Island cotton, particular attention must be given to potash fertilization in order to prevent defoliation of the plant before maturity. This problem is aggravated by the fact that most of the soils on which this crop is grown are deficient in potash. Where it is known that the soils are particularly deficient in this nutrient, or where the cotton has rusted in the past, it is suggested that additional applications of potash fertilizer be given as a topdressing. The bulletin also covers information on planting, the control of boll-weevil (a particularly important subject in connection with Sea Island cotton), harvesting, ginning, and marketing of the crop.

¶ The United States Department of Agriculture Yearbook for 1942 entitled "Keeping Livestock Healthy" is devoted to livestock diseases. This is the seventh in a series of Yearbooks, each exhaustively dealing with a particular phase of agriculture. It is a fitting companion to this notable series and fully comes up to the high standard set by the preceding volumes. From the fertilizer viewpoint, the chapter on nutritional diseases of farm animals by L. I. Madsen, is of particular interest. The effects of calcium, phosphorus, magnesium, salt, iodine, and other mineral deficiencies are discussed, and ways of preventing such diseases by means of proper fertilization are given. Another chapter on nutritional diseases of cattle by the same author considers potassium in addition to the above elements. It is pointed out that under ordinary practical diets, this nutrient will be supplied to animals in sufficient amount to meet their needs, but experimentally induced potassium deficiency is found to have an unfavorable effect on the animal.

¶ Four practical circulars dealing with the growing of various vegetable crops have been prepared by A. G. B. Bouquet. They are issued as Oregon Agricultural Extension Circulars 353, 369, 370, and 377, dealing respectively with Growing Carrots for Canning and Freezing; Muskmelons, Cantaloupes, and Miscellaneous Melons; Sweet Potatoes; and A Monthly Schedule of Suggested Operations in Growing Vegetables for Home Use. For carrots a fertilizer similar to 4-12-12 at 500 pounds or more per acre, with a minimum of 30 pounds of borax per acre also included, is recommended. For cantaloupes and melons, manure and fertilizer analyzing 3 to 4% nitrogen, 10 to 12% phosphoric acid, and 6 to 8% potash are recommended. For sweet potatoes, a fertilizer mixture approximately equivalent to a 4-10-15 fertilizer is suggested. In addition to information on fertilization, suggestions on soil adaptation, varieties, cultural practices, and diseases and their control are given. In the circular on the Monthly Schedule of Operations, general information on growing various crops is given but no specific fertilizer recommendations are included since these are given in publications devoted to the crop in question.

¶ Another excellent publication on vegetable growing is "The Home Vegetable Garden" by C. H. Nissley, New Jersey Agricultural Experiment Station Circular 428. Practical information on starting plants, fertilizing soil, cultivation, harvesting, and storage is given. Specific information for individual crops and helpful tables make this a valuable guide to those who wish to have a small vegetable garden. In addition to lime and manure, fertilizer such as 5-10-10 or 5-10-5 is suggested. Since this bulletin was written before the new war grades were put into effect, other similar grades would have to be used, those most likely fitting in with the recommendation being 4-10-10 and 4-12-8.

¶ "Soybean Varieties and Culture" is the title of a pamphlet prepared by the Agronomy Department of Purdue University and issued by the Indiana Agricultural Extension Service. Comparative yields produced by eleven different varieties tested at the Experiment Station, cultural directions, and descriptions of the varieties are given. In connection with fertilization, it is stated that soybeans respond to a high fertility level, although the response to direct fertilizer application is sometimes disappointing due to the fact that soybeans are easily damaged by fertilizer coming in contact with the seed. It is suggested that other crops grown in the rotation be given generous applications of manure and fertilizer so that the soybeans can benefit from the residual effects. On thin soils, plowing under 300 pounds of 0-20-20, or its equivalent, has given excellent results in recent investigations. It is stated that on land already plowed and low in available pot-

ash, it is advisable to broadcast and disk in deeply 100 pounds of muriate of potash per acre. Liming also is very beneficial on acid soil.

¶ Information and experimental data on the growing of corn and oats in the South have been compiled by H. O. West and issued as Mississippi Experiment Station Bulletin 368 entitled "Corn and Oats." A comparison is made of the amount of digestible nutrients produced, labor requirements, and other factors that are likely to enter into a decision as to which of the crops is preferable to grow. In connection with each crop, data on variety, method of seed bed preparation, date and rate of planting, kind and amount of fertilizer to use, time of application, cultivation, and harvesting are given. For the most part, the data from various experiment station sources are given with little or no interpretation.

¶ To help farmers in the efficient production of tomatoes for canning, J. H. Beattie, W. R. Beattie, and S. T. Doolittle have prepared U. S. Department of Agriculture Farmer's Bulletin 1901, "Production of Tomatoes for Canning and Manufacturing." General information on soils suitable for growing canning tomatoes, crop rotation, preparation of the soil, manuring, fertilizing, liming, best adapted varieties, obtaining plants, setting plants, transplanting solutions, irrigation, insect pests, diseases and their control, and grades of canning tomatoes are given. The authors point out that tomatoes can be grown on a wide variety of soils provided there is good drainage. For best results the soil should be fertile and in good condition. Crops such as tomatoes, potatoes, peppers, or eggplants which are closely related to the tomato should not be grown on the field for at least three years previous to growing tomatoes, since there is a possibility of carrying over diseases in this way. The use of manure is highly beneficial, but better results frequently are obtained when the manure is applied to the preceding crop rather than directly to the tomato crop. The fertilizer to use will vary with soil and cropping conditions, and local information should be obtained on best fertilizers for each individual farm. As a general guide, the authors point out that in New Jersey a leading grower turned under a winter cover crop of rye and made two 800-pound applications of 5-8-7 fertilizer. Another grower turned under a wheat cover crop with six tons of manure and used 1,000 pounds of 4-8-10 fertilizer. In Ohio a common application is to use 300 pounds of 0-12-12 fertilizer broadcast previous to setting the plants, and then at planting time applying additional 200 to 250 pounds of the same fertilizer by means of an attachment to the planter. In Indiana 400 to 600 pounds of fertilizer such as 2-16-8, 2-12-6, 2-8-16, 2-8-10, 3-12-12, or 0-12-12 are used with an additional side application of a nitrogen fertilizer if needed. This bulletin will be found very useful by all tomato growers.

"The Planting and Maintenance of Lawns," Agr. Exp. Sta., Ala. Polytechnic Institute, Auburn, Ala., Cir. 85, May 1942, D. G. Sturkie and H. S. Fisher.

"Serving Arkansas Agriculture," Agr. Exp. Sta., Univ. of Ark., Main Station, Fayetteville, Ark., Bul. 417, June 1942.

"Chemical Composition of Arkansas-Grown American Grapes," Agr. Exp. Sta., Univ. of Ark., Fayetteville, Ark., Bul. 420, June 1942, Howard Reynolds and J. E. Vaile.

"Effects of Rootstock Upon Composition and Quality of Fruit of Concord, Campbell Early, and Moore Early Grapes," Agr. Exp. Sta., Univ. of Ark., Fayetteville, Ark., Bul. 421, Howard Reynolds and J. E. Vaile.

"Plant More Winter Legumes," Agr. Ext. Serv., Univ. of Ark., Fayetteville, Ark., Leaf. 41, August 1942.

"Pastures for the Coastal Plain of Georgia," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 27, June 1942, J. L. Stephens.

"Twenty-first Annual Report 1940-1941," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 32, July 1941.

"The Growing of Sea Island Cotton in the Coastal Plain of Georgia," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 33, Jan. 1942, J. G. Jenkins.

"Peanut Production in the Coastal Plain of Georgia," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Bul. 34, Jan. 1942, S. A. Parham.

"Forest Grazing and Beef Cattle Production

in the Coastal Plain of Georgia," Ga. Coastal Plain Exp. Sta., Tifton, Ga., Cir. 8, June 1942, H. H. Biswell, B. L. Southwell, J. W. Stevenson, and W. O. Shepherd.

"Winter Cover Crops," Agr. Ext. Serv., Univ. of Ga., Athens, Ga., Cir. 300, Aug. 1942, E. D. Alexander.

"Progress Report of Potato Research," Agr. Exp. Sta., Univ. of Idaho, Aberdeen Branch Station, Moscow, Idaho, Cir. 85, June 1942, J. E. Kraus and others.

"Influence of Cultural Factors on Alfalfa Seedling Infection by Pythium debaryanum Hesse," Agr. Exp. Sta., Univ. of Iowa, Ames, Iowa, Res. Bul. 296, March 1942, W. F. Buchholtz.

"Studies of the Production of Sweet Potatoes for Starch or Feed Purposes," Agr. Exp. Sta., Univ. of La., Baton Rouge, La., Bul. 348, June 1942, W. D. Kimbrough.

"Seed and Soil Treatment for the Control of Damping-Off," Agr. Exp. Sta., Univ. of La., Baton Rouge, La., Bul. 349, June 1942, L. H. Person and S. J. P. Chilton.

"Suggested Varieties, Dates for Planting, and Fertilizers for Truck Crops in South Louisiana," Agr. Ext. Serv., La. State Univ., Baton Rouge, La., E. Cir. 231, Jan. 1942, G. L. Tiebout and A. C. Moreau.

"Winter Legumes," Agr. Ext. Serv., La. State Univ., Baton Rouge, La., Agron Series No. 15, August 1942.

"Accumulating Soil Nitrogen by Manure and Cover Crops," Agr. Ext. Serv., Univ. of Md., College Park, Md., Cir. No. 139, Aug. 1942.

"Annual Report," Agr. Exp. Sta., Mass. State College, Amherst, Mass., Bul. 388, Feb. 1942.

"Annual Report," Exp. Sta., State Board of Agr., Lansing, Mich., 1941.

"Winter Legumes for Nitrogen," Agr. Ext. Serv., Miss. State College, State Colleg, Miss., E. Leaf. 31, Aug. 1942, J. M. Weeks.

"Soybean Production in Missouri," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Bul. 445, June 1942, B. M. King and Denver I. Allen.

"The Revegetation of Abandoned Cropland in the Cedar Creek Area, Boone and Callaway Counties, Missouri," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Res. Bul. 344, June 1942, William B. Drew.

"Grass Silage in Wartime," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Cir. 234, May 1942, H. A. Herman and A. C. Ragsdale.

"Controlling Plant Diseases in the Home Garden," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Cir. 238, June 1942, C. M. Tucker.

"Filling the Silo with Corn or Sorghum," Agr. Exp. Sta., Univ. of Mo., Columbia, Mo., Cir. 239, July 1942, J. E. Comfort.

"Fifty-fifth Annual Report of the Agr. Exp. Sta.," Univ. of Neb., Lincoln, Neb., 1941.

"Agricultural Research in Wartime," A. R. 1940-41 Agr. Exp. Sta., Univ. of Nevada., Reno, Nevada.

"Estimating the Value of Range Forage for Grazing Use by Means of an Animal-Unit-Month Factor Table," Agr. Exp. Sta., Univ. of Nevada, Reno, Nevada, Bul. 160, June 1942, Mark A. Shipley, C. E. Fleming, and Bryant S. Martineau.

"Feeding Experiments With Beef Cattle to Determine Nutritive Values of First, Second, and Third-Crop Alfalfa Hay," Agr. Exp. Sta., Univ. of Nevada, Reno, Nevada, Bul. 161, June 1942, F. B. Headley.

"The Home Vegetable Garden," Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Cir. 428, April 1942, Charles H. Nissley.

"Growing Winter Barley in New Jersey," Agr. Exp. Sta., Rutgers Univ., New Brunswick, N. J., Cir. 447, Aug. 1942, Carlton S. Garrison.

"Cottonseed Treatments in New Mexico," Agr. Exp. Sta., State College, N. M., Bul. 290, April 1942, Glen Staten.

"Sixty-first Annual Report, 1942," Agr. Exp. Sta., Geneva, N. Y.

"Dry-Bean Production in New York," Cornell Ext. Bulletin, Ithaca, N. Y., Bul. 489, April 1942, E. V. Hardenburg.

"Pastures for Pullets and Poults," Cornell Ext. Bulletin, Ithaca, N. Y., Bul. 502, May 1942, E. Y. Smith and G. H. Serviss.

"Wheat in Wartime Poultry Rations," Cornell Extension Bulletin, Ithaca, N. Y., Bul. 490, April 1942, E. I. Robertson.

"Growing Raspberries for Home Use," Cornell Ext. Bulletin, Ithaca, N. Y., E. Bul. 498, April 1942, M. B. Hoffman.

"Growing Strawberries for Home Use," Cornell Extension Bulletin, Ithaca, N. Y., Bul. 499, April 1942, A. Van Doren.

"Annual Report 1941," N. C. Agr. Ext. Serv., Raleigh, N. C.

"Progress of Agr. Research in Ohio 1938-1939," Ohio Agr. Exp. Sta., Wooster, Ohio, Bul. 617, Dec. 1940.

"Gladiolus and Dahlia Culture," Agr. Ext. Serv., Columbus, Ohio., Ext. Bul. 100, July 1941, Alex Laurie.

"Experiments with Greenhouse Tomatoes: Varieties, Cultural Methods, and Relationship Between Yield and Vegetative Vigor," Agr. Exp. Sta., Okla. A. and M. College, Stillwater, Okla., E. Bul. B-260, Sept. 1942, F. A. Romshe.

"Propagation of Trees and Shrubs by Seed," Agr. Exp. Sta., Okla. A. and M. College, Stillwater, Okla., E. Cir. C-106, M. Afanasiev.

"Feeding Dairy Cows on Pasture," Ext. Serv., Oregon State College, Corvallis, Ore., E. Bul. 592, April 1942, H. P. Ewalt and R. W. Morse.

"Growing Carrots for Canning and Freezing," Ext. Serv., Oregon State College, Corvallis, Ore., E. Cir. 363, March 1941, A. G. B. Bouquet.

"Muskmelons, Cantaloupes, and Miscellaneous Melons," Ext. Serv., Oregon State College, Corvallis, Ore., E. Cir. 369, May 1941, A. G. B. Bouquet.

"Sweet Potatoes," Ext. Serv., Oregon State College, Corvallis, Ore., E. Cir. 370, August 1941, A. G. B. Bouquet.

"A Monthly Schedule of Suggested Operations in Growing Vegetables for Home Use," Ext. Serv., Oregon State College, Corvallis, Ore., E. Cir. 377, Nov. 1941, A. G. B. Bouquet.

"Trials of Annual Flowers," Agr. Exp. Sta., State College, Pa., Bul. 426, March 1942, E. I. Wilde, C. B. Link, and J. R. Culbert.

"Care of the Home Lawn—Fall Program," Agr. Ext. Serv., State College, Pa., Mimeo., 1942, Fred V. Grau.

"Report of the Puerto Rico Experiment Station 1940," U. S. D. A., Washington, D. C., May 1942.

"Factors in the Breeding of Cotton for Increased Oil and Nitrogen Content," Agr. Exp. Sta., Knoxville, Tenn., Cir. 79, April 1942, N. I. Hancock.

"A Strain of Nancy Hall Sweetpotato Selected for Color of Flesh," Agr. Exp. Sta., Knoxville, Tenn., Cir. 80, April 1942, N. D. Peacock, Arthur Meyer, and A. B. Strand.

"Fifty-fourth Annual Report 1941," Agr. Exp. Sta., College Station, Texas.

"Adaptability Studies with Bearded Iris in Texas," Agr. Exp. Sta., College Station, Texas, Bul. 615, August 1942, S. H. Yarnell.

"Bermuda Grass," Agr. Ext. Serv., College Station, Texas, E. Cir. C-176, (1942), John J. Ingalls.

"Grassland Maintenance in Vermont," Agr. Exp. Sta., Burlington, Vt., Bul. 484, April 1942, D. E. Dunklee and A. R. Midgley.

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Economics

¶ Undoubtedly one of the gravest problems now facing farmers is labor. During the coming year in order to produce enough crops to meet the requirements of our country and our allies, and also to make a profit for themselves, it will be necessary for farmers to adopt every possible practice that will mean saving labor or getting the most out of the supply available. Brief practical hints on how to do this are given by E. Van Alstine and H. W. Riley, in Cornell Extension Bulletin 505 entitled "Save Labor in Growing Crops." The proper use and care of machinery, working the soil at the proper time, increasing yield and quality of crops by use of proper seed, liming and fertilization, proper cultivation, and control of weeds are suggested as ways of increasing the efficiency of the farm enterprise. In connection with the use of lime it is stated, "Many hours of labor are lost whenever a seeding is made on land too acid for the best possible growth of clover." Poor results from the use of manure and fertilizer also may be obtained if the soil is too acid. It is further stated, "Any deficiency in available phosphoric acid or potash wastes a farmer's time to the same extent that it decreases the growth of legumes. Insufficient legumes waste his time to the same extent that yields of corn and other non-legumes are lowered by lack of nitrogen. Proper fertilizing pays dividends in time as well as in yield."

¶ An interesting and complete discussion of tobacco in the United States has been prepared by Charles E. Gage in U. S. Department of Agriculture Circular 249 entitled "American Tobacco Types, Uses, and Markets." The characteristics of the various tobacco types, where and how they are grown, cured and used, amounts produced, marketing methods, and related information are given.

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Farms Solve Sugar Problem

AT A TIME of sugar rationing many low-income farm people who are taking part in the rehabilitation program of the Department of Agriculture are producing most of their own food including, wherever possible, sorghum, maple syrup, or honey.

Many Southern farmers use a home syrup mill, powered by a mule, to squeeze the juice from sorghum stalks. They boil down the juice in kettles and store it in jugs. This home-made "sweetening," richer in iron content than refined white sugar, tastes good on the traditional hot cakes and Southern biscuit. But it is used also with home-grown, whole-grain cereals, in canning, and in making pies, cakes, cookies, candy, jams, and preserves.

Small cooperative mills, intended for making syrup for home use, have been established in many Southern communities with the aid of loans from the Farm Security Administration. About 25 acres of cane or 100 acres of sorghum provide juice for one mill of this type, shared by the group. The season lasts two to three months, and a few farmers, working together, provide the labor.

In other regions, the chief home-produced sweetening used by farm families is maple syrup, which contains considerable calcium.

Beekeeping is practical for some farm families. FSA loans have enabled a number of small farmers to buy a few hives to get started. Three to five hives will keep a family supplied with honey.

Some Experiences in Applying Fertilizer

(*From page* 17)

show much the same trend as has been reported in this paper. Of equal interest are his studies on alfalfa. In his elaborate experiment with this crop, the highest yields have been where all lime and mineral fertilizers were plowed down. These plots after four years are in perfect health and vigor, while the plots not so treated are rapidly declining.

The field experiments on fertilizer applications inaugurated and supervised by my associates and myself have been widely scattered in the 13 Northeastern states. They have covered a considerable number of the row-planted crops, and more recently have been used in extensive studies on alfalfa and orchard cover crops. In the main, the results from these studies have been most encouraging. They have led to extensive,

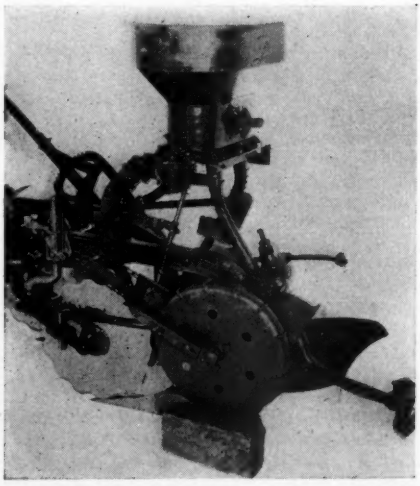

Fig. 4.—This fertilizer attachment for placing fertilizer on furrow bottom was designed for experimental work and is not in production at the present time.

cooperative studies with state agronomists and crop experts, some results having already appeared in the official publications. But most of all, perhaps, they have convinced me that only by continuous research can we ever hope to effect changes in practices that will insure the maximum efficiency from fertilizer use.

Continuous exposure to the problem of crop fertilization during the past 35 years and extensive personal study of methods of application have led to certain fairly definite conclusions. These are presented for whatever value they may have.

1. Improved methods of application have increased greatly the efficiency of fertilizers used.

2. Greater uniformity in plans for experiments are needed in studying any one crop.

3. Response of crops to specific methods of application is greatly influenced by soil class.

4. Methods of application as related to the ratio as well as concentration of N and K need further study.

5. More information is needed on deep placement of fertilizers by both the plow down and band methods, separately and in combination.

6. Further research on starter solutions is desirable.

Boron in Agriculture

(*From page* 22)

usually tagged so the farmer will not use the fertilizer on other crops that might be sensitive to borax.

Borax may be applied at almost any time of the year. Application at time of seeding is usually recommended by authorities. With an established stand an early spring application will generally give good results. Many farmers apply borax after the first cutting and, if rainfall is optimum, get good response even on the second cutting.

The work on red clover, crimson clover, ladino, and lespedeza has not progressed to the point that alfalfa tests have, but it is thought that likely some published information will be available on some of these crops by the fall of 1943.

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Wartime Accidents Endanger Crops

(*From page* 19)

them. The Agricultural Extension forces are waging a special fire-preventing and fire-fighting campaign. The F.S.A. has vivified accident prevention among its clients through movies and demonstrations. The American Red Cross gives an instructor training course in home and farm accident prevention; these instructors should carry the word in many directions. Manufacturers of farm equipment have standardized and redesigned machine parts to make them safer. Safety garments are coming on the market. And now, an agricultural Interdepartmental Safety Committee is at work on accidents as a definite part of National Defense and war production. Its colorful leaflet, "Watch Your Step," is known far and wide.

Insurance goes hand in hand with prevention. The problem is definitely twofold: How to prevent and alleviate; how to compensate or indemnify. As more precise information is available, is collected, and is analyzed, the ready practicability of farm-accident insurance is bound to be improved. The subject is admittedly complex, but the Department of Agriculture is working on it and will surely find the way. The reason farmers do not use compensation insurance widely is also twofold; the nature of farm business makes it largely a family enterprise with only seasonal outside help and the prevailing minimum premium rates are relatively high. A plan is needed that will give the farm family and the occasional hired hands some protection against the results of accidents and give it at a cost that is commensurate with earnings for the specified period.

But to show up in the war crops this year and next, prevention is the thing. When it comes to crops, farmers need to be reminded to look carefully to the safety of their equipment and how it is used, to their methods of cultivating, harvesting, and storing. These are such everyday matters that each farm family thinks nothing will happen to them—until father gets the fall and the broken collar bone. Then who will cut the corn? Will he be well in time to store the crop? Who will we get to do it if he isn't? Suddenly these are burning questions in the family, and the answers may determine the family's contribution to total supplies.

Danger lurks all along the way—familiar but unrecognized danger—and until it has been throttled by care, in the aggregate it threatens daily the big crops now confidently expected throughout the war years.

Lespedeza Pastures For Florida

(*From page* 10)

TABLE 2.—THE EFFECT OF LIME AND FERTILIZER MIXTURES AND SOURCES OF LIME ON THE CHEMICAL COMPOSITION OF LESPEDEZA ON A PLUMMER SOIL, ORLANDO, FLA., 1941

Soil Treatment Pounds per Acre	Chemical Constituents, Per cent Dry Basis**			
	Calcium	Phosphorus	Potassium	Protein
450# 0–16–8	1.080	0.210	0.620	14.5
Lime and 450# 0–16–8	1.462	0.169	0.610	12.5
Lime and 75# Muriate of Potash	1.182	0.129	0.720	12.0
Lime and 450# Superphosphate	1.316	0.182	0.328	12.4
Lime and 450# 0–16–16	1.233	0.197	0.693	14.8
Dolomite and 450# 0–16–8	1.140	0.201	0.518	12.6

Lime—ground limestone (93% $CaCO_3$) applied at ¾ tons per acre.
Dolomite—(36% $MgCO_3$ 56% $CaCO_3$)
** The mean differences for treatments in calcium, phosphorus, and potassium are significant as computed by the analysis of variance method.

of Common and Kobe lespedeza at the rate of 15 to 25 pounds per acre is recommended for pastures. The Kobe furnishes feed primarily during the first year, and Common volunteers during subsequent years.

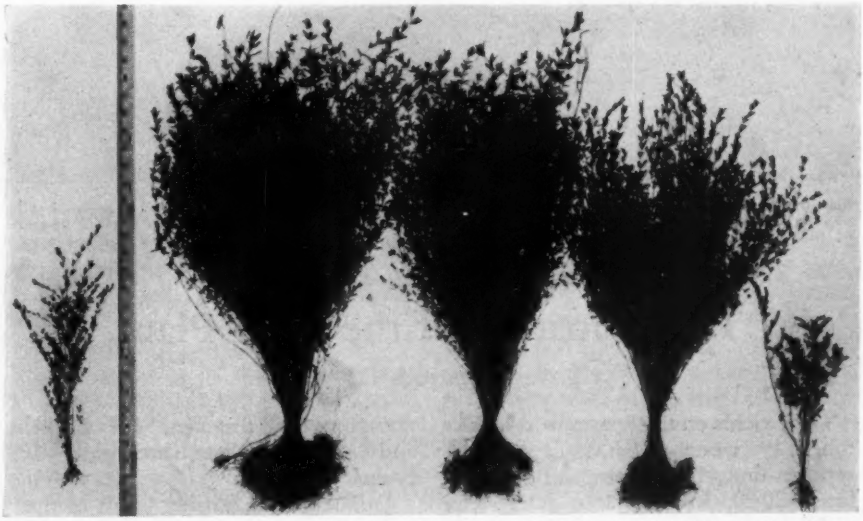

Fig. 7.—Lespedeza variety and inoculation are important. All treated with 1,500 pounds of lime and 450 pounds 0-16-8. Left to right: Kobe not inoculated, Kobe inoculated, Tennessee #76, Common, and Korean.

Korean lespedeza germinated satisfactorily, but did not make satisfactory growth (Fig. 7).

Although uninoculated lespedeza did not fail on some of the soils tested, the growth was augmented greatly during the first year when the seed was inoculated (Figs. 1 and 7). The second season's growth of lespedeza on inoculated and uninoculated plots did not differ greatly.

Lespedeza should be planted in February or March on closely grazed sods or on firm seed beds (Fig. 8). It may be planted as late as June on newly prepared seed beds where grass competition will not retard the growth of the lespedeza seedlings. Rolling to pack the soil on newly prepared seed beds is desirable.

Little is known about the best grazing management practices of annual lespedeza. Good stands and growth of lespedeza were obtained on two experimental lespedeza-carpet grass pastures when grazing was delayed until the lespedeza reached a height of four inches. These two pastures have been grazed rotationally.

Preliminary results show that lespedeza increases the productivity and quality of forage as exemplified by increased carrying capacity and cattle gains when compared with carpet grass pastures.

Fig. 8.—A lespedeza-carpet grass pasture grazed by grade heifers. One ton of lime and 450 pounds 0-16-8 fertilizer were applied in early March and seeded two weeks later with a mixture of inoculated common and Kobe lespedeza seed. The closely grazed carpet grass did not retard lespedeza.

The Nutrition of the Corn Plant

(*From page* 13)

Corn yields on the Sparta field on October 19 were: residues, 2 bushels; residues-lime, 12 bushels; and residues-lime-0-20-20, 36 bushels an acre. The yields on the Stroh farm on October 15 were: no treatment, 84 bushels; superphosphate hill-dropped, 104 bushels; and superphosphate broadcast, 100 bushels an acre.

Differences in fertility levels of these two soils may be further illustrated by the chemical composition. At Sparta

the untreated soil was quite acid, pH 4.5, and when limed the pH was 6.5 with a very low total nitrogen content of 1,300 pounds an acre (two million pounds). On June 1 the nitrate or available nitrogen on untreated soil was 20 pounds, on treated soil 160 pounds. The soluble phosphorus was 14 pounds and the available potassium was 90 pounds. The Stroh untreated soil was acid, pH 5.2, and contained 3,800 pounds total nitrogen. Twenty pounds of soluble phosphorus and 300 pounds of available potassium were found to an acre. This soil was low in phosphorus and relatively high in nitrogen and potassium. The area had been cultivated at intervals during the previous season (1940) to kill out Canada thistles. Nitrate or available nitrogen on June 1 was 90 pounds an acre; outside this area the amount was 40 pounds an acre. There was ample nitrate-nitrogen without excess.

On this field, Mr. Stroh has a rotation of corn-corn-oats with a seeding of red clover-timothy in the oats which remains three years and is moderately pastured. The cornstalk growth is plowed under each year which aids materially in keeping up the organic matter supply of the soil.

The Sparta field rotation is corn-soybeans-wheat-wheat. Sweet clover is seeded in each wheat crop and plowed under for green manure. Cornstalks, wheat straw, and soybean chaff are returned to the soil in order to add organic matter and to improve the physical condition of the soil.

Apparently, the soil on the Stroh farm has reached the point where it is much in need of additional phosphorus, a condition typical of a large part of the corn belt. These chemical results leave no doubt that this soil is approaching or has reached the point where additional potash is needed if 100-bushel corn yields are to be maintained. With the increasing difficulty of growing legumes on these acid soils, the time is at hand for liming and possibly the use of commercial nitrogen when a rotation is used which does not allow for sufficient legume nitrogen.

The Sparta soil (Cisne silt loam) with the extremely low total nitrogen (1,300 pounds) and a deficiency of organic matter has also a great handicap in an unfavorable physical condition. This kind of soil requires unusually careful management in order to build up a reserve of plant food and maintain satisfactory and profitable crop yields.

Thanks For A Little

(*From page* 5)

list is short because our investment in books was small; but no doubt they are familiar comrades of other fellows of my period, so those winter-night companions will bear a brief recital here.

Not a few of them have survived the age of fables in which they were born, to remain the best amusement of lads in this era when fairy tales come true. Others perchance have lost some of their glamour owing to their unfamiliar backgrounds.

My earliest recollections of trying to read center upon one of those heavy gilded tomes known as the Family Parallel Bible, with wood-cuts by Gustave Dore. I liked the nickel clasps particularly because I could snap them just like the ponderous old parson in our church services—and the book weighed about ten pounds and I usually got my scriptures in a very humble position indeed, flat on my belly across a sea of flowery ingrain carpet. I have it on my shelf now, but the last time I opened it, I am afraid, was to fill in two births and an obituary in our "family record."

By fits and starts I graduated to

other and lighter documents. My four boyhood favorites were the African adventures of that wild gorilla hunter, Paul du Challau, quickly followed by Don Quixote and his windmills (with Sancho Panza), then the winsome and skeptical Alice of Wonderland fame, and of course, good old Black Beauty.

I know you all follow me quite well as I become an addict to G. A. Henty, whose startling list of boy heroes lived the pages of romantic history. I know you probably do not follow me when I turn the pages of Doc Talmadge's Earth Girdled. That was one of those subscription books hawked from door to door in the nineties, but it had some horrific pictures in it just the same.

THEN of course there were family games to get our minds in tune with social contacts. Playing cards were a problem at our house because the situation was a sort of cross between my Mother's Methodism and Father's carefree army life. Which is to say, my fancy for poker or whist got little impetus at our social hour.

This paucity of perspicacity with cards lingers to this very day, causing my wife to gibe me for my ace trumping proclivities—but she calls it by a shorter and uglier word.

Returning to the game festivals again, my Father was a checker addict, specialist or stylist, or whatever one might call a whiz-dinger. He never graduated upward to the noble game of chess, but he tried to awaken my flagging zeal sometimes with certain ancient lap-board pastimes harking back to log-cabin leisure.

That is, he patiently sawed out and planed down a few square pine boards and marked them off. He raided Mother's sewing box for buttons. The result was known as "fox and geese" and "nine-men-morris." All I recall was that in the former game a big overcoat button was the fox and several white panty buttons were the geese. Maybe some of the handicraft experts and parlor game revivers in the 4-H Club contingent could dig up those old rules for us. As no metal or rubber is required for either of such innocent hour-wasters, it's worth thinking about.

Of course, the mystic ouija boards had their innings in our lamp-lit parlors too. Next to attending a regular spiritualistic meeting, these solemn and silent periods of breathlessness were a mid-Victorian substitute for the gory and ghastly radio horror dramas. When we combined the ouija program with a little hard cider and a choice lot of Uncle Solomon's weirdest graveyard and lonely house spook tales we couldn't make our hair lay flat with a curry comb and brush for a week.

Then when all else paled and we became surfeited with each other, somebody would seek solace amid the pile of double-exposure prints and shaded eyepiece known as stereoscopic views. Uncle Sol had contributed a nifty extra set lately, known as a Trip Through Hades, and Father's precious glimpses of corpses strewn on the best battlefields of the Civil War, highlighted with the hanging of the Lincoln conspirators in three views—these are memories that keep us awake even today.

TWO other reminders occur linked closely with the topic of home lighting. They were the magic lantern diversion, silhouettes, and shadow pictures. The former thing was a smelly and somewhat dangerous contraption given to small boys on Christmas with vivid colored glass slides for projection against one of Mother's bed sheets hung on the wall. The same sheet was also good for the finale of guessing who was which behind it, or making divers animals and other imitations with clawing fingers and fists.

This as I said brings me to discuss the filling and cleaning of lamps and barn lanterns. It may happen again under oil rationing, so let's get onto the technique. Not from me, however, as I cannot bear to go into it that far.

If you had to carry a coal-oil lamp

upstairs each night and study in a frosty room heated only with a bulging stovepipe heat reservoir known as a "drum," maybe you'd get the same idea of the value of snapping on a switch. But if you had to fit in wicks, soap and polish the narrow chimneys without dropping the last one in the house, and keep the bowls filled with oily fuel from a can with a potato on the spout—then I guess you'd quit cussing the daylight out of the public service utilities.

I AM aware that some districts of our good land still adhere to such illumination. The stable lantern is still in use here and there on back roads, and those who have them better keep them to use when the auto headlight is seen no more upon our nightly peregrinations.

Lastly, but not least, came the advent of Thanksgiving. Here we can set it down right away that the only real difference existing between Then and Now respecting that festive occasion lies in the way things were cooked and what they were cooked upon and with—not by any means in the way they were eaten and relished. Folks today like good eatables and consume them in the fashion common since Adam and the apple core, but fuel and stoves have much changed.

Our folks used to ramble on about the old Dutch ovens and the open fireplace spits and turners for roasts. In my day only ancient grandmas in remote areas still baked bread and cooked their dinners over open fires. Ours was the heyday of the cast-iron wood ranges, which meant working up a good appetite for victuals in the adjacent chip-strewn wood-shed.

They had back reservoirs for hot water which had to be kept filled. Their usual fire-box dimensions were small and hence the kids like me were busy hacking up poplar and oak and elm into suitable sizes to fit neatly beneath the circular lids. Polishing the surfaces of those wood-eating monsters was also a common chore. Draft handles must be regulated and creosote dripping around the chimney pieces added nothing to the adornment of the cook room walls. Lugging in the front-room base-burner also recalls highly argumentative conversation and weary legs and aching arms, all of which I have discussed with relish in former essays.

You just didn't step to the phone and call for a gallonage of oil or a ton or so of Pocahontas. No, siree, it was a late summer and early fall task to roam the farm wood-lot and fell the least desirable specimens for working up into fuel. It was a twice and thrice-warming business, that of providing fuel for former festive meals.

Neither did we worry over any scarcity of fats and oils at the grocery. Hog butchering time came handily just before the Thanksgiving and Christmas meals were prepared. Our supplies of lard and scrapple and other greasy tidbits were enough to give modern folks the dyspepsia.

YET when all is said and done I suppose few of us would care to hark back to the self-sufficing days, even if the harking business were pleasant and easy. But it isn't easy. After you have got a dog used to sleeping on a pillow in the best parlor chair, that hound won't want to stay very long out in the kennel. I'm like that, too, and so are you, old-timer, or else you are a rival of Munchausen.

The point I want to leave with you is this—that it won't do to fight each other over what there is left of the nicest and coziest nooks and situations. We'll have to be like the old old-timers when a stranger knocked at the door—haul him in and feed him on what there is left "down cellar in the teacup" and provide him with a shake-down somewhere in the corner.

They did it because America was worth a few discomforts and privations compared to the humility and slavery they had seen abroad. I reckon it's worth it now.

FAR ENOUGH

"It is high time," said the reformer, "that we had a moral awakening. Let us gird our loins. Let us take off our coats. Let us bare our arms. Let us—"

"Hold on, now!" exclaimed a tall, thin woman near the platform. "If this is to be a moral awakening, don't you dare to take off another thing!"

Mother: "Now, Junior, be a good boy and say 'Ah-h-h,' so the doctor can get his finger out of your mouth."

"Do you act toward your wife as you did before you married her?"

"Exactly. I remember how I used to act when I first fell in love. I used to stand in front and look at her house almost afraid to go in. Now I do the same thing some nights."

Have you heard about the salesman who started on a shoestring? He worked up until he got his face slapped.

Try this one eating a cracker: A skunk sat on a stump. The skunk thunk the stump stunk, and the stump thunk the skunk stunk.

Corny jokes about sentries still go on and on, and here's one that emanates from Camp Blanding, Florida. The vigilant sentry shouts, as usual, "Halt, who goes there?" Back comes the answer: "Hell, you wouldn't know me—I just got here."

"I wouldn't want to marry a widow and be a second-hand husband."

"Well, it's better than being her first husband."

Gob: "How are you this evening, honey?"
Girl: "All right, but lonely."
Gob: "Good and lonely?"
Girl: "No, just lonely."
Gob: "I'll be right over."

Sergeant: "What's your name?"
Draftee: "Quitz Jones, sir."
Sergeant: "Where didja get a name like that?"
Draftee: "Well, sir, it was like this. When I was born, my dad came in and took one look at me and said to mom, 'Dear, let's call it Quitz!'"

The chaplain preached a forceful sermon on the Ten Commandments, sending one private away in a serious mood.

He eventually brightened up. "Anyway," he said, "I never have made a graven image!"

A floor walker, tired of his job, gave it up and joined the police force. Several months later, a friend asked him how he liked being a policeman. "Well," he replied, "the pay and hours are good, but what I like the best of all is that the customer is always wrong."

Everybody loves to find fault; it gives a feeling of superiority.

AVAILABLE LITERATURE

The following literature on the use of fertilizers in profitable soil and crop management is available for distribution. We shall be glad to send these upon request and in reasonable amounts as long as our supply lasts.

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Vine Crops (General)
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Grow More Corn (South)
Fertilizing Small Fruits (Pacific Coast)
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Better Corn (Midwest) and (Northeast)
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Fertilize Pastures for Better Livestock (Pacific Coast)
What You Sow This Fall (Canada)
Home-grown Grains for Profitable Hogs (Canada)
What About Clover? (Canada)
Of Course I'm Interested (Pastures, Canada)

Reprints

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CC-8 How I Control Black-spot
II-8 Balanced Fertilizers Make Fine Oranges
MM-8 How to Fertilize Cotton in Georgia
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N-9 Problems of Feeding Cigarleaf Tobacco
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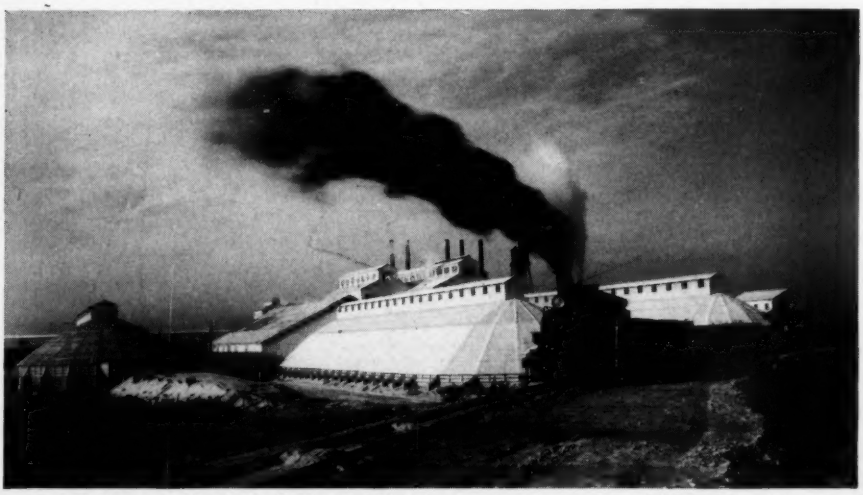

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